PHARNES, JOAN SANDRA. The Relationship Between Whole Body Movement and the Retarded Child's Ability to Learn Selected Geometric Forms. (1968) Directed by: Dr. Pauline Loeffler. 201 pp.

Seventeen students from the trainable retarded class at the Charles Moore School in Greensboro, North Carolina, participated as subjects in this study. The study was to investigate the effect of large motor movement on the ability of retarded children to draw and walk selected geometric forms. The seventeen children were divided into Treatment #1 and Treatment #2. The children in Treatment #1 remained in the classroom and received no large movement experiences, while the children in Treatment #2 performed whole body movements around a circle, square, and triangle.

All the children were given a pre-test, second test, and post-test consisting of five test items. The children were asked to put a formboard together, trace, copy, draw, and walk a circle, square, and triangle. Tests #1, #2, #3, and #5 were rated subjectively by the writer. Five raters, using a rating scale, rated Test #4.

On the bases of case study observations, it appeared that the children in Treatment #2 learned to trace the square and triangle, copy, draw, and walk a circle, square, and triangle.

It appeared on the bases of the observations made by the writer that the large motor movement performed around the circle, square, and triangle may have aided the children in Treatment #2 to learn to trace, copy, draw, and walk these figures faster than the subjects in Treatment #1.

APPROVAL SHEET

This thesis has been approved by the following committee of the Faculty of the Graduate School at The University of North Carolina at Greensboro, Greensboro, North Carolina.

Thesis Adviser Laurence A. Loeffler

Oral Examination Committee Members Marie Riley

Ethel F. Martin

Laurence J. Gordhan

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Date of Examination

# THE RELATIONSHIP BETWEEN WHOLE BODY MOVEMENT AND THE RETARDED CHILD'S ABILITY TO LEARN SELECTED GEOMETRIC FORMS

by

Joan Sandra Pharnes

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Pauline A. Loeffler

Thesis Adviser

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# CHAPTER I

## INTRODUCTION

No longer are the mentally retarded hidden in back rooms and left to survive for themselves. There has been a definite trend toward the upgrading of the educational program for the retarded child. Most retarded children now have the opportunity to attend special education classes in which the needs of the retarded children may more easily be met.

Basically, the needs of the retarded child are the same as for the normal child. He has the need for affection, need for belonging and a need for mutuality which involves the skills needed to work in a group situation.

Gesell, as indicated by Ames (32), outlined three of the more important principles of child growth behavior. Behavior develops in a lawful patterned way; first is the cephal-caudal direction, from head to foot; next is proximodistally, from the large trunk muscles to the fine distal muscles; and last is from the ulnar to the radial, from the outside of the hand to the inside.

Although all children show the same basic needs and follow the same rules of development, they do not all progress at the same speed. The level of ability of a retarded child is not as high as that of a normal child. Sloan (54) completed a study in which it appeared that the mentally handicapped were significantly inferior to children of

average intelligence in motor proficiency.

Sloan (52:405) concluded:

> Motor proficiency is not a distinct functioning which can be isolated from general behavior, but is, rather another aspect of the total functioning of the organism.

A high level of motor ability is usually attributed to strength, endurance, coordination, agility, flexibility, balance, and speed. For the mentally retarded child, the need of exercise for his physical development often exceeds the amount that he is able to find in his environment. Therefore, certain motor characteristics such as shuffling of the feet, poor posture and poor eye-hand coordination are seen in the movements of most retarded children. Because of poor movement habits and other limitations, the retarded child finds it difficult to adjust to a changing environment. Kephart (19:3) stated that "behavior, if it is to meet the ever changing needs of a constantly changing environment must be flexible." Responses cannot be fixed or learned for a specific problem for the responses would have to be too great in number.

It is then necessary to teach the retarded child, through the media of movement, an awareness of himself so that he can respond correctly to the stimuli around him. The child's ability to perceive his body, move his body and locate and use his body parts influences learning during the early childhood.

Humphrey (15:135) stated:

> The capacity an individual has to move his body effectively and efficiently through space is closely related to the more finely developed neurological phenomenon associated with memory, perception and problem solving.

Radler and Kephart (26:29) stated:

> Whether covert or overt, motor activity of some kind underlies all behavior including higher thought processes. In fact any behavior in which you might indulge can function no better than do the basic motor abilities upon which it is based.

Movement is essential for growth and learning. If a child cannot perform purposeful acts, so that a predetermined goal can be reached, then all of the muscular strength and integration of upper motor neuron function will be of little avail. "When the ability to move skillfully particularly in relation to objects (the essence of motor planning) fails to develop, man is considerably handicapped" (33:744).

Perceptual judgments and motor movements are impossible to separate. Piaget and Inhelder (25:15) noted:

> In this sense, every movement may be regarded as a transformation of the perceptual field and every perceptual field as a group of relationships determined by movement.

Piaget and Inhelder (25:13) further stated:

> ...it is worth noting that despite their differences and the time lag which separates them, both perceptual and representational construction are to some extent repetitive and possess a factor in common. This common factor is motor activity. Having already been the governing factor in representational images and, in all probability, the most elementary perceptions, motor activity now becomes the fountain-head of the operations themselves. The fact of its continuous existence through all stages renders motor activity of enormous importance for the understanding of spacial thinking.

To improve the perceptual-motor ability of children, motor tasks involving balance, agility, hand-eye coordination, manual dexterity, strength and flexibility should be included in everyday routines (35).

Because children with mental deficiencies may find it difficult to learn large complex activities, it is necessary to break these

activities down into simple components and improvement in these should be noted before moving to the next step.

Piaget and Inhelder (25:14) concluded:

> ...there can be no movement occuring in any conceivable type of behavior which does not rest on perception. Neither can there be perception taking place without activity which involves motor elements. It is the total "sensori-motor schema" which must constitute the starting point for the analysis of behavior, and not perception or movement considered in isolation.

It would then seem important to improve the basic motor skills so that a base could be provided from which accurate and more complex judgments can be made (35).

If movement is a necessity for learning, then perhaps whole body movements used to explore the dimensions of geometrical shapes to be learned would facilitate the learning of the geometrical shapes more easily and more quickly. From such an idea this study was designed.

# CHAPTER II

## STATEMENT OF THE PROBLEM

The purpose of this study was to ascertain the effect of large body movements over the dimensions of selected geometrical forms on the ability of the retarded child to draw and to walk the forms on verbal cue and without visual representation.

The basic problem was therefore described as an investigation of the relationship between whole body movement and the learning of selected geometrical forms, through case studies, of trainable retarded children.

# CHAPTER III

## REVIEW OF LITERATURE

People who work with mentally retarded have probably at sometime or other had their feelings summed up in this thought by Hayden (62:1):

> If he can't do it, perhaps it is my fault. And if I could just find a way to teach him, if I could just find a way to reach him, then he could do it.

Itard was one of the pioneers in the field of mental retardation. He fostered the thought that anybody could learn if properly trained and taught. Seguin, the first great teacher and leader in the field of mental retardation, also felt the importance of helping the mentally defective learn how to get along in society (18).

Although the work being done with the mentally retarded is relatively new, it can be summed up in these few words: "Although children may be the victims of fate, they are not longer the victims of our neglect" (48:926).

### Definition

At the present time there are between five and six million retarded persons in the United States, or 3% of the total population (11). One out of every 100 births results in a retarded child (3), or about 120,000 born every year will be so afflicted (57).

Dybwad (11:1) terms mental retardation as:

> ...a condition which originates during the developmental period and is characterized by markedly sub-average intellectual functioning, resulting to some degree in social inadequacy.

Willey and Waite (31:6) quote a definition given by A. T. Tredgold:

> A state of incomplete mental development of such a kind and degree that the individual is incapable of adapting himself to the normal environment of his fellows in such a way as to maintain existence independent of supervision, control or external support.

Willey and Waite (31:5) give the following definition:

> ...those human beings who, because of limited mental capacities, are without special assistance, incapable of adapting to their environment. These include children for whom special efforts must be made to enable them to live a reasonable normal, self-sufficient, productive life in our society.

Carter (3:5) defines a mental retardate as:

> ...a person who can be visualized simply as one who never attains the mental ability of the so called average person, i.e., one who is mentally able to function adequately and independently in an accepted manner, in our present society, he can be regarded as mentally retarded.

Ames (57:111) cites definitions by three organizations concerned with children's diseases and impairments. The National Institute of Nervous Disease and Blindness (57:111) defines mental retardation as "A manifestation of disease or dysfunction of the brain." The United States Children's Bureau (57:111) defines retardation as "...impaired or incomplete mental development." The National Association for Retarded Children (57:111) terms mental retardation as:

> ...a condition in which intelligence is prevented from attaining full development, limiting the victims' ability to learn and put learning to use.

The definition set forth by the American Association on Mental Deficiency (27:23,24) states:

Mental retardation refers to subaverage general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behavior.

## Causes of Mental Retardation

Mental retardation can be caused by any condition that hinders or interferes with the child's development before birth, during birth or in the early childhood years. Over 100 causes have already been identified, but these only account for about one-fourth of all identified cases of mental retardation (55).

Causes of mental retardation and deficiency can occur in one of five periods. Retardation caused during the antenatal period is that retardation which develops before birth and includes all familiar and congenital types; retardation caused during the prenatal period is the result of complications during pregnancy; retardation in the paranatal period is due to injuries at birth; and retardation in the postnatal period is due to injuries, disease, toxic agents, and infection; and occurs after birth but before the completion of mental development (31).

More specifically, the causes include: prenatal infections in the mother or postnatal infections in the child; German measles, mumps or Asiatic flu in the mother during the first three months of pregnancy; prenatal intoxications and allergic reactions; paranatal brain damage; postnatal poisons and allergic reactions; postnatal injuries and vascular accidents; metabolic dysfunction in the child as in amino acid, calcium or carbonhydrate metabolism; abnormalities of endocrine function; disease and conditions due to new growth and skin lesions; chromosomal or genetic causes and unknown causes (3).

The symptoms in mental retardation have been presented schematically by several people. Malamus presents them as: malformation, destructive disorders, and metabolic disorders (31). Clarke and Clarke present them as subcultural defects, dominant genetic defects, recessive genetic defects and defects of obscure origin (31). Kugelmass separates them into developmental varieties, metabolic varieties, neuromotor varieties and psychological varieties (31). And Brenda presents them as antenatal disorders, metabolic disorders, degenerative disease and total personality disorders (31).

One of the causes of mental retardation seems to be the low socioeconomic status of the family and of the community. These culturally deprived communities show such conditions as a depressed and non-stimulating living environment, poorer health care, complex motivational factors and lack of opportunities. Somehow, these conditions interfere with the normal intellectual development during the early developmental years (27, 29).

Almost all studies report a higher incidence of mental retardation among males than among females. This can be attributed to hereditary factors which make it more likely for a male to manifest recessive characteristics carried by chromosomes, or can be attributed to a social system which requires a stricter standard of economic self-sufficiency for a male than for a female (27).

## Classification of Mentally Retarded

In 1910, Goddard recommended a system of classification, based on test ratings, to the American Association for the Study of the Feeble-

minded. The Idiots were those individuals with a mental age up to and including two years. The Imbeciles were those with a mental age of three to seven years. The Morons were those with a mental age from eight to twelve years (8).

These terms later became obsolete. However, due to this system of classification, one-half of the population of the United States during World War I was classified as mentally deficient.

Davies (8:6) concluded that:

> Reliance upon the mental age criterion alone for classification is now generally recognized to have been inadequate and misleading.

Today, the American Psychiatric Association has classified mental retardation as mild deficiency, moderate deficiency, and severe deficiency. Educators use the terms educable, trainable, and custodial (27, 31).

Ten fields were listed by Fernald as being important to the study and diagnosis of mental retardation. These included physical examination, family history, personal and developmental history, school progress, examination in school work, practical knowledge and general information, social history and reactions, economic efficiency, moral reactions and mental examinations (8). The degrees of mental retardation were then determined by tests from which the intelligence quotient could be calculated.

Although the I.Q. may be useful, it is suggested by the American Association of Mental Deficiency that a sensible practice of using I.Q. ranges for a basis of classification instead of specific scores be used. The I.Q. also assumes that the nature of the individual's past will

continue into the future. But this assumption is hazardous "because of the large number of biological, social, cultural, and psychological factors that may affect human beings" (31:29).

Since the M.A., or mental age, is the average score obtained on test items from various age levels, it does not completely and accurately characterize the mental ability of all persons whose average score is the same (16). The American Association for Mental Deficiency has set up a rating scale which measures I.Q. in standard deviation ranges. Below average refers to performance which is greater than one standard deviation below the population mean of the age group involved on measures of general intellectual functioning (27, 31).

The American Association of Mental Deficiency states that the fundamental concept of mental retardation utilizes the two dimensions of measured intelligence and the adaptive behavior of the individual. In order that a person be termed mentally retarded, it is required that he demonstrate significant deficiencies in both measured intelligence and adaptive behavior.

The term adaptive behavior includes two major aspects of adjustment:

> ...1. the degree to which the individual is able to function and maintain himself independently, and 2. the degree to which he meets in a satisfactory manner the culturally-imposed demands of personal and social responsibility (16:51).

"Mental deficiency currently is applied to mentally retarded persons, who as adults are likely to be socially incompetent" (31:212).

Willey and Waite (31:8) also state that:

> Social adjustment is particularly important as a qualifying condition of mental retardation at the adult level where it

> is assessed in terms of the degree to which the individual is able to maintain himself independently in the community and in gainful employment as well as by his ability to meet and conform to other personal and social responsibilities and standards set by the community.

Generally speaking, as Willey and Waite have quoted Perry (31:7):

> ...Each mentally defective person must be considered, not as belonging to a homogeneous category called deficiency, but as an individual; his subnormal intellectual functioning must be considered, not as constitutionally or organically determined, but as an interdependent complex of constitutional or physiological processes, interpersonal processes, and socio-cultural processes; and from a research standpoint the mentally defective must be approached, not with the assumption of irreversibility and permanence, but with the assumption that benevolent intervention may lead to a reversibility or improvement of the conditions.

## Characteristics of the Mentally Retarded

Many retarded exhibit multiple problems including apathy, impulsiveness, lack of behavioral control, hyperactivity, emotional instability, irritability, fluctuation of moods, distractibility, and low stamina. They also may easily fatigue, and show poor body coordination. They may exhibit an over-dependence upon others, lack of curiosity, sensory impairment, defective sight, hearing, disorders of perception, short attention span, figure ground confusion, attention to irrelevant features, disorders in concept formation, lowered reasoning ability, language disorders, and speech difficulties. Extremely limited vocabulary, social incompetence, difficulty in relating to others and lack of social amenities may also be characteristics of the mentally retarded (12). These may appear singly or in any combination. Some of these traits may be caused by the specific nature of the disease, or the cause may be traced to lack of training or improper training.

There are five classes into which the mentally retarded are divided. The borderline class can be classified as the slow learners in a regular classroom with intelligence quotients from 75 to 90. They can usually get along well enough to support themselves in their environment.

The mildly retarded have I.Q.'s from 52 to 67 and an adult mental age from 8 years, six months to 10 years, ten months. They are able to maintain themselves in laboring jobs, but may need assistance in handling their social and financial affairs. They may also be able to complete 4th or 5th grade work, but they usually lack the skills necessary for employment.

The moderately retarded have I.Q.'s from 36 to 51 with an adult mental age of 6 years, one month to 8 years, five months. They exhibit self-care skills rather than skills that lead to independent employment. Their speech is simple and concrete and usually understandable. Their self-concept is usually more positive in the home and neighborhood and they can be of some economic use in the home or in a sheltered environment. Their thought processes and perceptions are influenced by their needs, wishes and self-concept. Institutional care is usually not required.

Kirk (29:63), as quoted by Stevens and Hever (29:63), states that the moderately retarded child is one

> 1. who is of school age, 2. who is developing at the rate of one-third to one-half that of the normal child (I.Q.'s on individual examinations roughly between 30 and 50), 3. who, because of retarded mental development, is ineligible for classes for the educable mentally retarded who will, however, probably not be custodial, totally dependent or require

> nursing care throughout his life; 4. who has potentialities for self-care tasks (such as dressing, eating, toileting), and who can learn to protect himself from common dangers in the home, school or neighborhood; 5. who has potentialities for social adjustments in the home or neighborhood and can learn to share, respect property rights, cooperate in a family unit and with neighbors; and 6. who has potentialities for economic usefulness in the home and neighborhood--by assisting in the chores around the house, and in doing routine tasks for remuneration in a sheltered environment under supervision--even though he will require some care, supervision and economic support throughout his life.

The characteristics of the severely retarded are a Binet I.Q. between 20 and 35 with an adult mental age of three years, nine months to six years. They may have sustained neurological damage which might restrict social behavior, and personal habits and training which require careful, prolonged and supervised practice. They tend to show very little independent behavior and are often lethargic and apathetic. Adults at this level may be openly friendly and become attached to persons with whom they come in contact. They are incapable of communicating only on a concrete level. Many of these individuals may learn to walk and vocalize a greeting and total supervision is usually required (27, 31).

The profoundly retarded have a Binet I.Q. below 20 with a mental age of 3 years, eight months and below. They are frequently restricted in their ability to move and cannot usually protect and care for themselves. They relate to others only on the most elementary level and cannot be trained in self-care, socialization or economic usefulness (27, 31).

## Education of the Mentally Retarded

There have been some major shifts in the basic philosophies concerning retarded children. At first, the objective of the public schools for retarded was to relieve the stress upon normal children and their teachers by removing the children from regular classes and placing them in a special class. This approach was called the Relief Philosophy and it entailed a negative attitude and pessimistic expectations toward the retarded child. Later, the concern for him was that he should be happy. He was placed in a special class so that he would not have to compete with normal children and suffer unnecessary frustrations. This was termed the Happy Philosophy but involved a negative and sterile orientation. The Salvage Philosophy emphasized the teaching of academic skills, sometimes at a watered-down level, but usually at levels beyond the child's actual capacity to achieve. The opposite reaction to this was the Handiwork Philosophy in which stress was placed upon manual skills. The implication was that the retarded child could not learn from books but could learn to do things with his hands (16).

The modern philosophy emphasizes the worthwhileness of the child. It assumes that the child can become a contributing member of society. Education represents an attempt to carefully evaluate the specific capacities of each child and to assist in developing them to the highest degree possible. It attempts to be both humane and realistic. It often emphasizes the vocational goals of the educational process (16).

Indifference and rejection are giving way to collective concern and positive action with the idea that every child should be given the

opportunity to use his capabilities regardless of limitations. If educators keep the retarded child's potential in mind as they consider preparing him to do things for which there is a social use and need, they will be aiding both the children and society at large (38, 61).

The key to helping a child with learning problems is first to attempt to understand the child. The achievement motive in retarded children is inferior to that of normal children. Therefore, special motivational methods must be employed to compensate for this deficiency if learning is to be effective. The behavior of the retardate tends to be highly rigid so that he finds great difficulty in shifting learning procedures to new tasks. Retarded pupils have shorter memories for recent events than do their contemporaries of comparable mental age, but often overlearning can compensate fairly adequately for this limitation. Some retarded pupils have less ability to focus their attention on one area. But inferior attention may itself be used as a defensive maneuver previously learned by the retarded (16).

The general principles of learning for normal individuals apply to the retarded as well. These include preparing the child carefully for the new learning situation by motivating him effectively, proceeding in small steps from the known to the unknown, using positive effect to reinforce learning, reinforcing learning by appealing to various sense modalitities to provide for ample overlearning, and an avoidance of failure to reinforce learning by successive success experiences (16). Skinner, as quoted by Pinegar (65:7), recommends "the opportunity of being correct from 85 to 95 per cent of the time to develop maximum comprehension and maximum retention." The retardate

learns by doing, learns by following a process of small steps from one thing to the next, and retains knowledge by overlearning (65). The educator must move the retardate from a highly egocentric position toward a position in which he represents the individuality of the other child. The child must be made aware that other people are individuals also.

What a retardate does learn he grasps at a much slower rate and frequently in a qualitatively different way. He shows little imagination and deals with concrete rather than abstract kinds of knowledge. Teachers working with him must therefore deal in terms of feelings rather than thinkings. His capacity to understand academic subjects is limited to simple rote learning. Learning is not easily transferred to everyday situations and the retardate is slow to respond to the correct stimulus unless it is pointed out to him (65).

Three major training objectives for the trainable retarded are to develop each pupil's competency in personal and social aspects of adaptive behavior, sensory and motor skills and economic usefulness (61).

It has been noted by Chaney (60) that education can be broken into three levels of endeavor and these same levels should be applied to the mentally retarded. The tolerance level is the level at which the child can do the task successfully; the challenging level is the level at which the child is encouraged to give it another try, and the frustration level or level at which the child cannot perform the skill. At this level, if the skill is broken down into parts, the child should be able to find his tolerance level (60).

Learning in the human organism begins with motor activity. The first learning experiences of a child become the foundation for everything which is to occur subsequently. It follows that if the foundation is weak and the motor organization is inadequate, then the more complex activities which come later will be unstable, inadequate and unpredictable (64). Achieving motor representation of ideas is an important factor in the education of the retarded child as he learns by doing (2). Motor development is considered to be the basis upon which the child's ability to control his body is built. Movements made by a developing child make up the learning units that contribute to his total store of knowledge (26).

Cratty (6:i) states:

> There are indications in recent studies that with improvement in motor skill and fitness the retardate and neurologically handicapped will sometimes begin to perform better in tests of intellect.

Uhr (30:i) also states:

> ...a growing number of people are beginning to feel that many of the central problems of behavior, intelligence, and information processing are problems that involve patterns.

It is felt that the motor pattern lies at the basis for all additional learning (63). A motor pattern is considered to be a complex, coordinated series of movement which accomplish a definite purpose (64). It is important to differentiate the patterns because the specific movement and skills are maintained as a part of the total organism and remain as part of a repertory of motor responses rather than just a collection of independent skills. It is through this differentiation in pattern that a child builds up a motor response system that is sound. The

development of a structure, or pattern, is a complex process because it depends upon the quality of the responses and also upon an organization of these responses. Not only must responses exist but the interconnections between the responses must be preserved (63). Rightly trained nerve cells could be compared to that of a trusty servant, who attends to the household chores without being looked after, while the mistress is free to entertain and to work in other areas (58).

The four motor patterns which appear to be particularly significant are balance and maintenance of posture, locomotion, contact--reach, grasp, release, and receipt or contact with the moving object and propulsion. For a very large number of children, the learning difficulty begins at the early motor stage because they have learned to use their motor responses to accomplish certain ends. They may have failed to expand or generalize the motor responses on the basis of the information gathered and, therefore, have not developed a motor interaction with the environment (44).

All such skills are acquired through practice progressing from gross accomplishment to refined and discriminating adeptness (31). This gross activity is defined by Cratty (6:73) as:

> ...sensory experience in which a child is totally involved; his vision, his kinesthetic input, vestibulae cues and tactile experiences combine to produce more effective, more motivating and quicker classroom learning on the part of the retarded.

Seashore (50:259) defines fine motor tasks as:

> ...neuromuscular coordination which involves smaller segments of the body or minimum contractions of widespread musculatures.

## Perception

Perception is concerned with identification and recognition of contrast and comparison of objects and events (42). Perceiving has been taken to be a process by which the organism relates itself to its surroundings. In perceiving, the individual must interpret, discriminate and identify objects and conditions existing in the environment. Perceptions themselves are more than the apprehension of the things and their activities. Perception pertains to the qualities of things, and to the abstract relations between things. Perception should integrate into concept and judgments (1).

Cratty (7:5) defines perception as:

> ...an ever continuing, as well as an immediate, phenomenon, dependent not only upon a situation's momentary core but also upon the context in which the event occurs and upon past experiences. This process involves organizing, feeling change, and selecting from among the complexity of events to which humans are continually exposed, so that order may be attached to experience.

Cratty has broken perception into five parts. The preparatory set is described as unconscious past experiences; the object observed assumes a distinct identity or form and is brought into spatial and temporal proximity to the organism with some kind of stimulus being required; sensory stimulation is that in which the object must emit stimuli which human receptors can pick up; selection and interpretation is that in which the average of the individual's past experience with stimuli is compared to present experience, and a quantitative or qualitative value judgment is made; and decision requires the choice of either to move or not to move, the quality of the individual's response being related to his whole personality (7).

The learning process is related to the perceptual process because perception gives meanings to events, objects or situations. Learning involves a series of perceptions, or perceptual change, brought about through repeated exposure to the same or similar objects and situations (7). Motor performance is closely associated with perception, which in turn, is strongly related to purposeful motor activity. Any treatment designed to influence motor function cannot avoid affecting the perceptual process (12, 33). When planning the motor education of an individual, it should begin with gross motor activities that stress posture and equilibrium reaction and then proceed to tasks that require finer skills (33).

Perceptual motor education programs are designed with these immediate goals in mind, as stated by Smith (53:31):

> ...the achievement of more adequate perceptual functioning by improving directionality, spatial orientation and visual perception of objects and events through sensory experiences. The ultimate goal is, of course, improvement in general scholastic performance, in communication skills and in understanding number concepts.

Some evidence is available that will shed light upon the nature of motor activity and its possible relationship to classroom learning (35).

1. Because the motor attributes of children are highly specific, the perceptual-motor skills taught to the children should involve balance, agility, hand-eye coordination, manual dexterity, strength and flexibility.

2. Perceptual judgments and motor functioning sometimes cannot be separated so that perception is probably being trained while engaging in many movement experiences.

3. Because muscular tension facilitates direct forceful acts, while inhibiting other complex coordinations, the child should be placed in a situation where the social-emotional tone will not contribute to muscular tension when he is expected to learn complex skills.

4. Reducing complex tasks to simple components often aids the child with severe perceptual problems to learn these skills.

5. The manner in which the child perceives and moves his body will influence learning during early childhood so that it is necessary to begin with the perceptual tasks that the child knows and then proceed to new ones.

6. In order to heighten a child's self-concept, it is necessary to provide a situation in which the individual will experience success even though this may be slight.

Kephart (19) suggests the importance of sensory-motor awareness. The sensory awareness of one's body and one's place in space has been shown to be crucial to the formation of an adequate self or bodily image. Motor activity can help to provide this sensory awareness and through certain physical practice techniques a retarded child is able to engage in mental functions not ordinarily expected of him.

## Perception and Learning

Piaget (53) observes that sensorimotor experiences are basic to later intellectual operations of children. His theory is a developmental theory of intelligence. He postulates a definite sequence of developmental steps, a sequence which is said to be the same for every individual. Piaget (27) conceives of intelligence as an equilibrium between the organism and its environment. The intellectual functioning of an individual is both quantitative and qualitatively different at different stages of life.

Piaget and Inhelder (25) propose three major periods of intellectual development. The first is the sensorimotor intelligence occurring from birth to two years, which deals with the child's learning to coordinate various perceptions and overt movements. The child learns to perform a

wide variety of successful responses for practical satisfaction. The second period is the preparation for and organization of concrete operations and runs from two years through eleven years. It is the period which is concerned with the child's acquisition of language and his ability to think representationally and logically about the world. The third period is the period of formal operations and this period continues from eleven years onward and deals with the individual's development of highly abstract and formal logical systems. He becomes capable of forming true theories about the nature of the world and of utilizing hypothetical-deductive reasoning. Piaget and Inhelder (25:39) sum up movement and perception in this statement:

> Movement coordinates successive perceptions and constitutes the sum total of transformation ensuring the transition from one perception to another.

The German term Gestalt denotes shape or form as a property of things. Sometimes it denotes a "concreted individual and characteristic entity, existing as something detached and having shape or form as one of its attributes" (13:332). "The tendency for perceptual consistency and completeness is fundamental to the Gestalt Theory" (7:83). Gestaltists emphasize the total perceptual field, but attention is devoted to the central figure. They emphasize the notion that experience and the brain processes underlying that experience are inherently related and organized in such a way that maximum order and simplicity are obtained (7:27). "The way in which an object is perceived is therefore determined by the total context in which it is embedded" (27:301). At each step of development, Gestalt theorists assume that the behavior of

the child is in "large part a function of the phenomenal world in which he lives" (22:301).

Montessori (12) recognized that the child's ability to note likeness and differences lies at the base of his ability to form associations and to make judgments. Stimulation and contrast between stimuli is not enough. The child must be made to make judgments based on perceptions of likeness and differences at increasing levels of difficulty. The child must meet the demands of one level before being allowed to proceed to a higher level. Therefore, the child can progress at his own rate without impeding the progress of another.

Kephart (19) has stated that physical activity provides the essential basis for learning more complex skills. Children develop readiness of all kinds by piling one simple skill on top of another. These skills are acquired by natural maturation and learning. Kephart feels that a breakdown in any stage of perceptual-motor abilities, verbal development, or concept development will influence the child's performance at a later stage. In order to help the child who is in difficulty, it is necessary to identify the stage at which learning can take place. It is necessary to get the child back on the track and to help him integrate and complete his readiness skills.

## Perceptual-Motor Procedures

Bobath (59) devised a way to influence muscle tone and to break up abnormal reflex patterns and to prepare the individual for movement through facilitation of higher forms of response. This concept involved the presence of abnormal spinal and tonic reflex activity which prevents

the brain injured child from performing normal movements.

The motor behavior of the child is characterized either by the domination or relief of abnormal tonic reflex activity. These effects leave the individual with primitive mass patterns of movements including either total flexion or total extension of the whole body. Because of this they prevent the individual from performing skilled and selective movements. Because of the total patterns of the tonic reflex activity, the body is treated as a whole (59).

During treatment, emphasis is placed upon making movements in a normal manner in order to give the individual maximum normal and sensory-motor patterns. Activities are not introduced until the patient is physically ready for them and mastery of gross patterns is required before the fine skills are attempted (59).

In 1956, a small group of men formed the Institute of Human Potential located in Philadelphia. They included Dr. Temple Faye, a neurosurgeon; Dr. Robert Doman, a psychiatrist; and Dr. Carl Delacato, an educator. They concluded that since the brain was injured, the brain must be treated. It was hoped that brain cells could be trained to take over the activities for which the damaged cells were responsible.

The theories, upon which the treatment programs for these children are based, are as follows:

1. The child's nervous system made up of the brain, spinal cord and nerve pathways develops in a definite pattern from conception to about the age of eight;

2. The process of neurological organization may be measured on a scale in six areas: a. movement of the body; b. speech; c. manual skills; d. visual skills; e. hearing skills; and f. tactile skills;

3. The developmental speed of each child will vary;

4. Some methods of rearing a child will slow down the neurological process;

5. Any child that is an immature or a slow learner is a result of a delay in neurological development;

6. All children can be included in the range of neurological development that stretches from severely brain damaged to a child who is superior mentally and physically;

7. The neurological development of a child can be speeded up by certain non-surgical methods;

8. By stimulating the development of the central nervous system it is possible to move the child up in neurological development;

9. By the same token the neurological development of a normal child can be stimulated (59).

There are thirteen developmental levels which range from no mobility to walking in a cross pattern. There are four stages that make up the thirteen developmental levels. These include moving the arms and legs without forward movement, crawling, creeping, and walking (9). The child's level of competence is then determined and he is supplied with information normal for each level (51). If a lower level of development is incomplete, then all the succeeding higher levels will be affected (9). Students that have a problem with mobility, speech, and reading are assigned to a certain stage of neurological organization. From here, the areas of neurological organization which have not been completed or are absent are overcome by passively imposing them upon the nervous system. "When the neurological organization is complete the problem is overcome" (9:7).

## Circles, Squares, and Triangles

The use of geometrical drawings has enabled workers to study the actual problems posed by the abstraction of shape. The abstraction of shape involves a complete reconstruction of physical space. This abstraction is made on the basis of the subject's own actions which are based originally upon a sensori-motor experience and are later dependent upon a mental representational space determined by the coordination of these actions (25).

Piaget and Inhelder (25:57) state:

> It is thus apparent that the process of development is very similar to that which occurs with spontaneous drawing, with a constant bias in favor of geometrical shapes which are easier to draw than natural figures.

As a result of several of the skills probably being learned at the same time, it is also necessary to develop basic grace and ease of movement which underlies successful performance in all areas of behavior. This coordination is essentially composed of two ingredients known as laterality and directionality. Laterality is the inner sense of one's own symmetry. Directionality is the projection into space of laterality--the awareness of left and right, up and down, before and behind (27). "Laterality, the feeling of awareness of the two sides of the body and the difference between them, comes before directionality" (26:35).

There are four stages into which the drawings of a child may be categorized. The first stage is pure scribbling. The primary feature of the child's drawing or scribbles is simple rhythm. Piaget and Inhelder (25:57-58) state:

> This very primate expression of ability to draw is the product of a continual hither and thither movement of the hand across the paper, and it is from such a rhythmic pattern of movement that the first shapes come to be distinguished.

Another important feature of these rhythmic movements is that they already contain, in an undifferentiated state, all those elements which will later go to make the drawings of straight lines, curves, and angles, even though the child cannot yet extract these from the rhythmic concept (25). Luquet (25) explains the last three principle stages as synthetic incapacity, intellectual realism and visual realism.

Synthetic incapacity is characterized by a clumsiness of the child's movements because of his limited and sporadic attention span. Also lacking is an understanding of the relationship of distance, proportions and three dimensional forms (25).

Intellectual realism is characterized by drawings which are not what the child actually sees of a specific object, but everything that is there. There is no understanding of proportions and because of a lack of coordination between systems there is no complete layout (25).

Visual realism is characterized by drawings that begin to take perspective, proportions and distance into account all at once (25).

The closing of the circle is one of the most complicated tasks. Closure not only requires accurate guidance of the chalk so that the beginning and the end of the line meet, but at the same time involves accurate stopping so there will be no overlap (25). Closure also requires the beginning of form perception and the awareness of what is necessary to produce a closed form. The square and triangle are drawn very similarly to the circle, but there is some attempt at a

differentiation by way of inward and outward movement as against circular movements. There are also more frequent breaks in the line and this is the beginning of straight lines and angles (25).

Some children have difficulty in producing a circular motion, particularly in larger figures. The problem arises when the child is required to cross the mid-line of his body in the course of movement. This shows that there is a lack of adequate kinesthetic-visual match (26). Curved shapes are only partially differentiated at this level. The main feature, which strikes the children, is the closed nature of the form. A square, rectangle or triangle is also closed but it exhibits complexities. A circle is closed and free from these added complications such as a straight line, parallel line or angle. For this reason the circle holds special fascination (25). The problem with which a child is faced amounts to producing a given shape through rhythmic movements. Therefore, the child must break this continuous rhythm even to draw a simple circle. At the same time he must take advantage of its bends and natural closures (25).

Copying a square involves the coordination between the hand and eye movements. There must be a connection between the internal feeling and the visual pattern, so the child knows rapidly and accurately that two of the lines in the square go up and down and the other two go left and right. Even more subtle and more difficult is the necessity to begin a movement, and to change the direction of that movement as one does in getting around the corners of a square (26).

In copying a square, the child must match what he does with his pencil to the pattern presented by the square he is copying. Each

movement and each change in movement must be controlled by visual stimuli (26). Before he begins to draw a square, the child must be able to distinguish between left and right. He must also be able to control the two sides of his body separately and simultaneously. In order to begin copying the square, the child must locate the beginning point. This point must be located with reference to his own body and the kind of movement which will be required to bring his hand to the starting point must be conceived. These problems of laterality must be overcome before he can begin to draw, because these specific movements must be controlled. Since drawing a square is a task in which the product is of small size, the control must be very accurate. The child must learn how to innervate the muscles on one arm without innervating in a similar fashion the muscles on the other. He must differentiate one arm from the other, the activities of one side of his body from the activities of the other, and the movement of hand and fingers from the total movement of the organism (19).

Squares and triangles require the location of lines in a particular direction taking into account the given angle. Their closure must be brought about by joining a number of separate elements instead of merely following an unbroken line (25).

The most difficult drawing task is that of a triangle because of the inclination of the three sides and the coordination of the three angles with a suitable closure. The child who has difficulty with diagonals will indicate his problem by drawing "stair-stepped" lines or by wandering off course in the direction of his line. He will also have trouble with corners where he must determine a new direction. The

results will be "dog-eared" corners (25, 26).

This matching process is intricate and subtle. Radler and Kephart (26:66) state that:

> ...it involves accurate recognition of the form the child is to copy; the translation of this visual recognition into a series of commands sent from the brain to the muscles; translation of the nerve impulses received by the muscles into controlled movement patterns; and finally, the creation of whole new sets of recognitions, messages and translations based upon the child's own observations of the marks he himself is making in the process of drawing his square. Thus, if one of the angles starts to become too wide, the following line must be bent in a little; if one of the lines ends up too long, the following line must be sharpened somewhat.

## Studies

Cratty (35), Robbins (49), and Krippner (45) take issue with Delacato's concept of Neurological Organization.

Robbins (49) states that Delacato's experiments contain major faults in design and analysis. Krippner (45) states that there is a lack of research data to support the concept of neurological organization as Delacato describes it.

Cratty reports Oliver as finding "that by improving their physical skills in a concrete way, they may enhance their ability to function intellectually at increasingly higher rates" (6:1). Naylor and Briggs, as reported by Cratty, concluded that "there are indications in recent studies that with improvement in motor skill and fitness the retardate and neurologically handicapped will sometimes begin to perform better in tests of intellect" (6:i).

Keogh and Keogh (43) tested the ability of educationally subnormal boys with normal boys in their ability to copy four simple line

patterns by drawing and walking. They found that the educationally subnormal boys had extreme difficulty in organizing their gross movements to represent patterns in a larger field.

Shurtleff (51) noted that children who had been deprived of erect posture in the ages between eighteen months and three years had considerable delay in acquiring reading and writing skills in grade school. These children confused right from left and could not distinguish printed "d" from "b," or "E" from "3." They were disorganized in space. Concrete learning processes could be initiated to help these children learn what they failed to gain. The process of writing and copying has been shown to be one that can be improved by "patterning" but it depends upon a central nervous system which must be intact.

Cratty (6:74) also stated that:

> ...if one accepts the premise that gross movement is another helpful modality through which one may learn, it is also reasonable to assume that placing these other shapes on the playground and encouraging children to walk around them, to talk about them and to play games on them, may help them to learn these shapes when they appear in other forms on the blackboard and in books.

Lowden, as reported by Radler and Kephart (26), tested 1,510 children on their ability to copy forms including a circle, cross, square, and triangle. Each child's copying performance was then rated and checked against school achievement. The results showed that the test of visual skill was actually more closely related to school achievement than was the standard I.Q. or intelligence test.

Haring and Stables (41) asked two questions. How was motor development related to learning? Would gross motor training and

gross eye training improve the ability to learn? They concluded from their study that:

> ...a gross motor training program affects in a positive way, the child's development in fine motor areas which have a direct effect on learning capabilities. A gross motor training program, thus, should be an important part of the curriculum for the educable mentally retarded child.

Sloan (51) stated that motor proficiency was not a distinct aspect of functioning which could be isolated from general behavior, but was another aspect of the total functioning of the organism. This study was primarily concerned with the problem of motor proficiency and intelligence. The results indicated that such a relationship existed. It appeared that mental defectives were significantly inferior in motor proficiency to children of average intelligence.

# CHAPTER IV

## PROCEDURE

The problem of this study was to investigate the relationship between whole body movements and the learning of geometrical shapes by trainable retarded children.

### Selection of the Subjects

The subjects for this study were eleven Negro boys and six Negro girls, ranging from seven to thirteen years of age, from the trainable class at the Charles C. Moore Elementary School in Greensboro, North Carolina.

An interview was arranged with Mr. James Hemphill, director of the City Recreational Program for the Mentally Retarded. On his recommendation, an appointment was arranged with Mr. Frank Saunders, Director of the Mentally Retarded Program in the City of Greensboro, North Carolina. Mr. Saunders suggested that permission from the school superintendent of the public school system be obtained before actual assignment to a school could be made. A letter was written to Mr. Phillip Weaver, Superintendent of the Greensboro Public Schools, who in turn approved the project.

An interview was arranged with Mrs. Flossie Alston, the principal of the Charles C. Moore Elementary School. The outline of the program was presented to those who would be involved in the study. Permission was granted by the principal and the classroom teachers.

The children were observed in their classroom situation for one week so that some relationship could be established with the children prior to the study.

## Background Data

After the consent of the school superintendent, the school principal, and the classroom teachers had been given, background information was obtained from school reports. These data included: age of the child, cause of retardation if known, mental age and chronological age, parental background, the number of children in the family, the economic status of the family, if it were known, and other information that would lead to a better understanding of the limitations and capabilities of the child.

A psychological report for each child was obtained from the school psychologist. These reports can be found in Appendix C.

## Class Organization

The seventeen children were divided into two groups by a process of drawing names. One of the groups was concerned with learning the geometrical shapes without the use of whole body movements, and the other group was concerned with learning the geometrical shapes by using large body movements around these shapes.

The nine children in Treatment #1, which excluded large body movements around the figures, were taught by Mrs. Charles Boswell, teacher of the youngest trainable class.

The eight children in Treatment #2, which emphasized large body movements around the geometrical shapes, were taught by the writer.

Treatment #1

A twelve week program consisting of three, one half hours per week for nine pupils was constructed. Mrs. Charles Boswell, teacher of the youngest trainable class, led this part of the study. She was encouraged to move in her own methods of presentation. She was asked not to give whole body movement activities involving the geometrical shapes, or to encourage the children to draw these shapes without cues.

The method of presentation was similar to the presentation that was normally used at the first grade level. This included group participation in a semi-circle around the teacher, small quiet sit-down games and individual paper work at the desks. A copy of the lesson plans is presented in Appendix A.

Treatment #2

A twelve week program consisting of three, one half hours per week per student was constructed. The activities employed consisted of large movement activities over various geometrical forms. These were adjusted to meet the needs of each child. Because some children seemed to learn the three figures presented faster than others, it was decided to allow individual progression to other geometrical shapes such as the diamond and rectangle. (See Appendix A for lesson plans.)

The children were asked to do the following around the circle, square, and triangle: walk forward, walk backward, walk sideways, hop, jump, skip, and run. They were also asked to push objects, bounce the ball, and play tag around the figures.

As soon as they were able, they were encouraged to make their own figures on the floor from the materials available.

During the twelve weeks, the figures changed to some degree in their placement in the room. The cloth tape triangle on the floor was replaced by the diamond and the children were asked to make a triangle from the boards. Toward the end of the study, a cloth tape rectangle was placed on the floor away from the diamond. As soon as the child could, he was asked to make the shape out of the boards available. This was so the children would not associate certain figures with certain types of material.

Small objects were added during the study with which the child could play after completing his lesson. The ball and a small truck were two of the most enjoyed and often most used during the lesson.

Small geometrical shapes in the form of circles, squares, and triangles were made available. These included boxes with circles cut out in the side, a hanger, a small jar of paste, small rectangular blocks, a ball, and a truck.

Various materials were used to make the large figures. Among them were a large piece of canvas on which was painted a bright yellow circle, four feet in diameter and two inches wide; four pieces of 2" x 4' x 4" soft pine; and 1½" x 4' gold contact cloth tape. Due to the size of the room that was available for this study, it was impossible to make figures larger than this.

## Teacher Observations

Throughout the study, changes in the subjects' behavior were noted

by the classroom teacher. Among items noted for the subjects in Treatment #1 were: the child's ability to function as a member of the group; his ability to identify shapes by name; his ability to match the geometrical shapes to either ones on the chalkboard or held in the teacher's hand; the child's ability to identify the shape and color it a specific color; his ability to copy a form like the one he could see; his ability to pick out certain objects from other shapes using tactile and visual cues; and his ability to follow and understand directions.

Each child in Treatment #2 was observed for the following: his ability to correctly identify the shapes by name; his ability to make shapes on the floor without or with visual cues; the child's ability to understand and follow directions; his ability to associate word commands with motor patterns; the child's ability to correctly identify shapes through visual and tactile cues; the child's ability to understand the concept of left and right as related to discrimination of body parts; and his ability to maintain balance on an object while working on a specific problem.

## Administration of Tests

Five tests were administered three times during the study. The first three tests were given as a lead up to the fourth and fifth tests.

Test #1 consisted of a formboard, cut from plywood, in which there were three different sizes of the circle, square, and triangle. These small figures were made from styrofoam. The child was required to put the formboard together.

Test #2 consisted of giving each child a piece of paper with dotted lines that outlined the shape of a circle, square, and triangle. The child was asked to trace these shapes.

Test #3 consisted of giving a blank piece of paper to the child. He was shown a picture of a geometrical shape, 3/4 the size of the paper, and encouraged to make a figure like the one on the paper. The child had two attempts with each drawing.

In Test #4 the subject was given a blank piece of paper and was asked to draw a circle, square, and triangle without visual cues. Verbal cues were given and the child had two attempts with each drawing.

In Test #5, the child was asked to walk a circle, square, and triangle on the floor. The floor had no markings on it and the child was free to perform this task in his own manner. The same commands were used each time and if the child did not respond to the verbal cue of "walk a circle" then the cue "move around a circle" was given.

Tests #1, #2, #3, and #5 were subjectively rated by the writer.

Test #4 was rated by five raters and each judge rated both of the attempts in each of the trials. A rating was established on a five point scale, with five being high. A child could score as high as 25 points on one drawing. Since only the highest score for each geometrical shape was recorded for each test, a subject could score a possible 75 points in the pre-test, 75 points in the second test, and 75 points in the final test. The higher the score the better the drawing. A rating score sheet was given to each rater for each test. A copy of the rating scale and score sheet are in Appendix B.

Each subject was tested individually and was encouraged to take as much time as necessary. Because the child was accustomed to using a large pencil, one was provided for the tests. The child was free to ask questions and was encouraged to do so.

At the end of the study the subjects involved in Treatment #2 were also given the Stanford-Binet Form L-M (1960) I.Q. test by the school psychologist. A comparison was made between the I.Q. scores before the study and the I.Q. scores obtained after the study. Due to the amount of time involved in the testing of Treatment #2, it was deemed impossible to give this test to the children involved in Treatment #1. These psychological reports can be found in Appendix C.

## Treatment of Data

Spearman's rank difference correlation technique was used to find the correlation between raters on each of the tests. See Table V, page 137.

The results of the study were based on observations from the case study report made by the writer.

# CHAPTER V

## CASE STUDIES

### Treatment #1

This group of two girls and seven boys was instructed by Mrs. Charles Boswell. The children were introduced to the geometrical shapes of the circle, square, and triangle for an average of three half-hour periods per week for twelve weeks. The amount of time necessary to test the students was: one day at the beginning of the study, two days during the study, and two days at the end of the study. The children had classroom instruction for 31 lessons.

The classroom teacher was free to use any method of presentation of materials, but she was not to encourage the children to draw the geometrical shapes free hand or to use large body movements to traverse these shapes.

The lesson plan that was followed is in Appendix A.

### SUBJECT #1

#### Background Data

Subject #1 was born January 8, 1959, in Greensboro, North Carolina. There were seven children in his family. He had two older sisters. His father was a laborer and his mother completed the twelfth grade and worked as a maid. The family was in a low economic status.

At the time of this study, Subject #1 was nine years old. He was righthanded.

In the evaluation of his social and personal assets as rated by the classroom teacher for the first year of school, he was given the lowest scores that were listed on the rating scale.

His classroom teacher noted that Subject #1 was a very nervous child, but had shown some improvement in this condition during the school year. This boy was suspected to be retarded but the cause of retardation was not known.

Summary of Observations

Subject #1 had a hard time repeating the names of the figures. It was hard to understand the words that he would use. He was eager to respond although he was not able to name the figures correctly all the time.

In lesson #2, he was able to match the cardboard shapes with the shapes that were drawn on the chalkboard.

In lesson #8, he had difficulty coloring the proper shapes the proper color.

It was felt by the teacher that Subject #1 was consistently responding with the correct answers after lesson #13.

In lesson #19, he was able to identify the shapes that were held in the teacher's hand.

Subject #1 missed one lesson because of misbehavior.

In lesson #31, Subject #1 was unable to name the shapes correctly when he could not see them. It was thought by his teacher that his

nervousness might have something to do with his inability to feel the shapes.

## Test Results

### Formboard

Subject #1 had no trouble putting the formboard together at the pre-test, second test, or final test, although he did need a little more time due to his extreme nervousness.

### Tracing the Geometrical Shapes

Subject #1 was unable to follow the dots on the circle, square, or triangle in the pre-test.

In the second test, he was able to follow the dots around the circle in a wavering line. He was unable to remain in contact with the dots on the square and the triangle.

In the final test, Subject #1 was able to remain in contact with the dots around the circle in a clockwise direction. He could not remain in contact with the dots on the square or triangle and he produced a scribbled result.

### Draw One Like It

Subject #1 was unable to copy a circle, square, or triangle in the pre-test and second test.

In the final test, he was able to copy a circle, but his circle had one flat side. He was unable to copy a square or a triangle.

Draw a Circle, Square, and Triangle

In the pre-test, Subject #1 was unable to draw a circle, square, or triangle. In the second test, he was able to draw a circle but he was not able to close this shape. He was unable to draw a square or a triangle. In the final test, Subject #1 was unable to draw a circle, square, or triangle.

The pre-test drawings were the smallest. In the post-test, the subject did not seem to be as tense as he had been in the pre-test. He seemed to draw the same figure with a slight variation in each of the tests. This figure looked like an inverted comma.

Taking the highest score by each rater from each trial, Subject #1 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 9 | 11 | 5 | 25 |
| Square | 3 | 2 | 4 | 11 |
| Triangle | 1 | 1 | 4 | 6 |
| Total | 13 | 14 | 13 | |

Taking the total of the three tests, Subject #1 scored 13 points out of a possible 75 points in his pre-test. He also scored the same number of points in his final test. In the second test, he scored 14 points out of a possible 75 points. From the pre-test to the second test, he showed a gain of 1 point. He remained the same from the pre-test to the final test.

Walk a Circle, Square, and Triangle

When Subject #1 was asked to walk a circle, square, and triangle in the pre-test, he was not able to respond correctly to any of the

verbal cues. For the circle, he walked about one quarter of the way around a circle in a counterclockwise direction and stopped. When asked to walk a square, he took one step and stopped. When he was asked to walk a triangle, he just stood.

During the second test, he was unable to respond correctly to the verbal cues and was content to stand still.

In the post test, he was not able to respond correctly to the commands. He walked to the right a few steps when he was asked to make a circle and then repeated this for a square. He stood still when he was asked to walk a triangle.

Psychological Report

On November 16, 1967, Subject #1 was given the Revised Stanford-Binet, Form L-M (1960). At this time his chronological age was 8 years and 9 months and his mental age was 2 years 11 months. His I.Q. score was 32.

Due to the amount of time needed for this testing procedure, Subject #1 was not tested at the end of this study.

## Evaluation of Progress

Subject #1 improved in his ability to correctly identify the circle, square, and triangle and to trace the circle.

Subject #1 was unable to correctly identify the shapes when he traced them with his finger, and he could not trace the square and the triangle with a pencil. He could not copy a square and triangle. He was unable to draw a circle, square, and triangle and he could not walk a circle, square, or triangle.

Subject #1 remained the same in his ability to put the formboard together.

It appeared as though the circle was the easiest figure for Subject #1 to learn. He appeared to have learned this shape between the pre-test and the post-test.

## SUBJECT #2

### Background Data

Subject #2 was born in Greensboro, North Carolina on October 10, 1957. His mother completed two years of college and his father completed high school.

There were five children in the family and he had three older brothers. His father was a laborer and his mother was a housewife. The economic status of the family was low.

At the time of the study, Subject #2 was 11 years old. He was righthanded.

He completed grade one but notes from his first grade teacher indicated that Subject #2 was very withdrawn. His oral language was very limited. He showed very little interest in school work and showed a definite need for some form of special education.

His first year in special education was summarized by his teacher as one in which he showed considerable growth and adjustment. He also seemed competent in self care skills.

In his second year in special education, he showed interest in his work and worked well with his peers. After his third year, his classroom teacher noted that he was an outgoing child and knew how to

get along well with his peers.

Although the boy was suspected to be retarded, the cause of retardation was not known.

Summary of Observations

Subject #2 was able to pick up the proper responses quickly. He was always eager to answer for the other children if they could not answer.

In lesson #2, he was able to match the cardboard shapes with the similar drawings on the chalkboard.

Subject #2 was able to color the proper shapes the proper color in lesson #4.

At the 10th lesson, Subject #2 still had some confusion with the square and the triangle.

By the 13th lesson, Subject #2 was consistently responding with the correct answers. He would have to be constantly reminded to think before he answered. Even so, he would sometimes still give a wrong answer but would very quickly correct it. It was felt that he used this technique of giving the wrong answers so that he would get attention.

In lesson #19, Subject #2 was able to identify the shapes that were held in the teacher's hand. He could also name the shapes correctly when there were two or more held in the hand at the same time.

In lesson #31, Subject #2 was able to identify the shapes when he was not allowed to look at them.

## Test Results

### Formboard

Subject #2 was able to complete the formboard at all trials without any difficulty.

### Tracing the Geometrical Shapes

Subject #2 was able to remain in contact with the dots around the three shapes in the pre-test, second test, and final test.

### Draw One Like It

In the pre-test, Subject #2 was able to copy a circle and a triangle. He was unable to copy a square but drew a rectangle instead.

In the second test, Subject #2 was able to copy a circle, square, and a triangle.

In the final test, he was also able to draw a circle, square, and triangle.

### Draw a Circle, Square, and Triangle

In the pre-test, Subject #2 drew an oval shape for a circle. He was able to draw a square and a triangle.

Subject #2 was able to draw a circle, square, and triangle. He repeated this in the final test.

Taking the highest score by each rater from each trial, Subject #2 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 16 | 16 | 18 | 50 |
| Square | 22 | 14 | 18 | 54 |
| Triangle | 21 | 17 | 19 | 57 |
| Total | 59 | 47 | 55 | |

Taking the total score for each test, Subject #2 scored 59 points out of a possible 75 points in the pre-test. His lowest scores occurred in the second test where he scored a 49 from a possible 75 points. In the final test he scored 55 points from a total of 75 points. This was four points below his pre-test score.

Walk a Circle, Square, and Triangle

In the pre-test, Subject #2 was able to walk a circle on the floor without any outside cues. He moved in a counterclockwise direction. He did this without hesitation. When he was asked to make a square he walked up and down, but did not attempt to move around any corners. For a triangle, he made a shape that looked like an inverted J.

In the second test, he again was able to walk a circle but this time he moved in a clockwise direction. He walked left and right when asked to make a square and repeated this same movement for a triangle.

In the post-test, he walked a completed circle moving in a clockwise direction. He was able to walk a square and again he moved in the clockwise direction. When he was asked to make a triangle, he walked back and forth in a straight line.

Psychological Reports

On October 27, 1964, Subject #2 was given the Revised Stanford-Binet, Form L-M (1960). At this time his chronological age was 7 years

and 1 month. His mental age was 3 years and 11 months. His I.Q. score was 52.

On November 16, 1967, he was again given the Revised Stanford-Binet, Form L-M (1960). At this time his chronological age was 10 years and 1 month and his mental age was 5 years and 5 months. At this time his I.Q. score was 54. This was a two point gain over his previous I.Q. score.

Due to the amount of time needed for this particular test, Subject #2 was not tested at the end of this study.

### Evaluation of Progress

Subject #2 showed an improvement in his ability to copy a square, to draw a circle, and to walk a square.

Subject #2 remained the same in his ability to draw a square and triangle, to put the formboard together, to trace the circle, square, and triangle, to copy a circle and a triangle, and to walk a circle.

Subject #2 was unable to respond correctly when he was asked to walk a triangle.

Although Subject #2 showed an improvement in some of the skills, it was felt that he was familiar with the circle, square, and triangle prior to this study.

## SUBJECT #3

### Background Data

Subject #3 was born in Greensboro, North Carolina on April 13, 1959. There were eight children in the family. Three of the boys were older than the subject and she had two younger sisters. The father

completed the third grade and the mother completed the 10th grade. The father was employed by the City of Greensboro.

At the time of this study, Subject #3 was nine years old. She was righthanded.

Her classroom teacher stated that the subject was well liked by her classmates. She followed directions to the best of her ability. Being eager to please, she often would hurry without taking the time to listen well.

Subject #3 was unable to speak clearly but she continued to make good attempts at speaking.

Although Subject #3 appeared to be mentally retarded, the cause of the retardation was not known.

Summary of Observations

In the 3rd lesson, Subject #3 was able to match the cardboard shapes with the correct shape on the chalkboard. She was also able to trace these figures when they were drawn on the chalkboard.

In lesson #8, Subject #3 was able to respond correctly when she was asked to color the figures a certain color.

By the 12th lesson, Subject #3 knew the circle and triangle, but could not respond correctly when she was asked to identify the square. The most frequent answer, at this time, would be the triangle.

Subject #3 began to make the correct responses beginning with the 15th lesson. Although she could not pronounce the names clearly, she used her hands to show what she was attempting to say.

In lesson #31, she was able to identify the objects that she held

in her hands. Her eyes had been blindfolded.

## Test Results

### Formboard

Subject #3 had no difficulty putting the formboard together in the pre-test, second test, or post-test.

### Tracing the Geometrical Shapes

In the pre-test, Subject #3 was able to remain in contact with the dots on the circle and the triangle. She was unable to follow the dots on the square although she correctly made the shape.

In the second test, she was able to trace the circle. She traced the square but had two overlaps on the corner. She lost contact with the dots at the bottom of the triangle.

In the final test, she was unable to remain in contact with the dots around the square and the triangle although she was successful around the circle.

### Draw One Like It

Subject #3 was unable to copy a completely closed circle in the pre-test. She was unable to copy a square and a triangle.

In the second test, Subject #3 was able to copy a circle, square, and triangle.

She was also able to copy a circle, square, and triangle in the post-test.

Draw a Circle, Square, and Triangle

In the pre-test, Subject #3 was able to draw a completely closed circle. She was unable to draw a square or a triangle in the pre-test.

In the second test, Subject #3 was able to draw a circle, a square, and a triangle.

Subject #3 was able to draw a circle, square, and triangle in the final test.

Taking the highest score by each rater from each trial, Subject #3 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 17 | 15 | 19 | 51 |
| Square | 4 | 18 | 19 | 41 |
| Triangle | 1 | 9 | 12 | 22 |
| Total | 22 | 42 | 50 | |

Taking the total score for each of the three tests, Subject #3 scored a total of 22 points out of a possible 75 points in the pre-test. In the second test, she scored 42 points out of a possible 75 points. In the final test, she scored 50 points out of a possible 75 points. This was a 28 point gain over the score in the pre-test.

Walk a Circle, Square, and Triangle

In the pre-test, when Subject #3 was asked to walk a circle, she just stood. When she was asked to walk a square, she made a circle three quarters of the way around and then stopped. She moved in a counterclockwise direction. She made the same figure for the triangle, but only completed it three quarters of the way around in a clockwise direction.

In the second test, Subject #3 did not respond with any movement to the commands. She did move her hands around in a circle but would not move her feet.

In the post-test, she drew a circle with her hand but would not walk a circle. When she was asked to walk a square, she traced the tile on the floor with her finger but would not move her feet. She did not respond when asked to walk a triangle.

Psychological Report

Subject #3 was given the Revised Stanford-Binet, Form L-M (1960) on November 16, 1967. At this time her chronological age was 8 years and 7 months and her mental age was 3 years 6 months. Her I.Q. score was 39.

Due to the amount of time needed for this particular test, Subject #3 was not tested at the end of this study.

Evaluation of Progress

Subject #3 improved in her ability to match the geometrical shapes, to identify and name the circle, square, and triangle, to color the proper shapes and remain inside the lines, to copy a circle, square, and triangle, and to draw a square and triangle.

Subject #3 remained the same in her ability to put the formboard together, to trace the geometrical shapes, and to draw a circle.

Subject #3 was unable to respond correctly when she was asked to walk a circle, square, and triangle.

It appeared as though Subject #3 improved by the second test in her ability to draw a square and triangle. She was not able to apply

her knowledge of the circle, square, and triangle to Test #5. It was felt that Subject #3 did not understand what she was expected to do when she was asked to walk or move around the circle, square, and triangle.

## SUBJECT #4

### Background Data

Subject #4 was born in Greensboro, North Carolina on November 18, 1958. He was the oldest of two children. His father, a foreman, completed high school. His mother completed the eleventh grade and was a housewife.

At the time of this study, Subject #4 was 10 years old. He was righthanded.

He spent two years in the special education class. His first year was evaluated by his classroom teacher. She stated that Subject #4 was hyperactive and would not complete a task. After the second year, it was noted by the teacher that some improvement had been made in his social and emotional adjustment.

Because the parents had been concerned about this child's nervousness, a thorough evaluation was made by the Guilford County Health Department in 1967. It was found that Subject #4 had been a full term baby. He did not walk until he was fourteen months old and did not talk until he was two years old. At the end of this session, it was stated by the psychologist that his abilities and shortcomings did not fall into the well known pattern of mental retardation. Concreteness of thinking, immaturity in visual-perception and retardation in large and fine motor coordination were present.

The school doctor stated that Subject #4 appeared to be a microcephalic child who was badly retarded. The doctor could find no evidence of a specific neuromuscular dysfunction other than a general immaturity of the central nervous system.

Summary of Observations

Subject #4 participated in the first three lessons. He was able to match the cardboard forms to the identical shapes on the chalkboard. He was also able to trace the forms on the chalkboard.

Due to sickness, Subject #4 missed the next ten lessons.

In lesson #18, Subject #4 could not remember the names of the shapes.

By the 21st lesson, Subject #4 was able to correctly identify the circle, square, and triangle.

In the last lesson, he was able to identify the objects when he was not allowed to look at them. He gave quick and correct responses.

## Test Results

### Formboard

Subject #4 had no difficulty putting the formboard together in the pre-test, second test, or final test.

### Tracing the Geometrical Shapes

Subject #4 was unable to trace the circle or the square in the pre-test. He was able to stay in contact with the dots on the triangle.

In the second test, Subject #4 was unable to follow the dots completely around the circle. He was able to trace the square and the triangle.

He was able to trace the circle, in the final test, but was unable to close this figure. He was unable to trace the square and the triangle in the final test.

Draw One Like It

Subject #4 was unable to copy a circle, square, or triangle in the pre-test.

In the second test, Subject #4 drew an egg shaped figure for a circle. He was able to copy a square, but he was unable to copy a triangle.

Subject #4 was unable to copy a circle in the final test. He was able to copy a square, but he was unable to copy a triangle.

Draw a Circle, Square, and Triangle

Subject #4 was unable to draw a completely round circle in the pre-test. He was unable to draw a square or a triangle.

In the second test, Subject #4 drew a figure for a circle that had one flat side. He was unable to draw a square in this test. He was unable to draw a triangle.

In the final test, Subject #4 was able to draw a circle. He drew a rectangle for a square, but he was unable to draw a triangle.

Taking the highest score by each rater from each trial, Subject #4 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 18 | 10 | 18 | 46 |
| Square | 17 | 4 | 17 | 38 |
| Triangle | 1 | 1 | 2 | 4 |
| Total | 36 | 15 | 37 | |

Taking the total score for each of the three tests, Subject #4 scored a total of 36 points out of a possible 75 points. He decreased considerably in the second test and scored 15 points. In the final test, he scored a total of 37 points out of a possible 75 points. This was a one point gain over the pre-test score.

Walk a Circle, Square, and Triangle

Subject #4, a righthanded boy, was able to walk a circle in the clockwise direction in the pre-test. He did not respond when he was asked to walk a square and a triangle.

At the second test, he was again able to walk a circle in the clockwise direction. He did not respond correctly when he was asked to walk a square. He was able to walk a triangle but the figure had rounded corners. He moved in a counterclockwise direction.

At the post-test, Subject #4 was able to walk a circle in the clockwise direction. He was not able to walk a square, but he was able to walk a triangle.

Psychological Reports

On September 30, 1964, Subject #4 was given the Revised Stanford-Binet, Form L-M (1960). At this time his chronological age was 5 years and 10 months and his mental age was 3 years and 4 months. His I.Q. score was 52.

He was again given the Revised Stanford-Binet, Form L-M (1960) on February 15, 1966. At this time his chronological age was 7 years and 3 months and his mental age was 3 years and 8 months. His I.Q. score was 47. This was a 5 point decrease from the score he had obtained

two years before.

Due to the amount of time needed for this particular test, Subject #4 was not tested at the end of this study.

### Evaluation of Progress

Subject #4 improved in his ability to identify and name the circle, square, and triangle, to match the geometrical shapes, to identify and color the proper shapes, to identify the shape using tactile sense, to copy a square, and to walk a triangle.

Subject #4 was unable to respond correctly when he was asked to copy a circle and a triangle, draw a triangle, and walk a square.

Subject #4 showed no improvement in his ability to put the form-board together, to trace the geometrical shapes, draw a circle and a square, and walk a circle.

Between the pre-test and the post-test, he learned how to draw a square. By the second test, he was able to walk a triangle.

## SUBJECT #5

### Background Data

Subject #5 was born on September 16, 1960, in Greensboro, North Carolina. There were three children in the family. He had an older brother and an older sister.

His father completed elementary school and his mother completed high school. The father was not living in the home.

Subject #5 started in a regular class at a public school but could not keep up with the work. He later went to a church school for retarded children and then went to the Charles Moore Elementary School.

Subject #5 was suspected of being mentally retarded, but the cause of retardation was not known. He was righthanded. He had very poor eyesight and needed to wear glasses.

After a year at the Charles Moore Elementary School, his classroom teacher noted that Subject #5 was liked by his playmates. He seemed to understand the more acceptable social behavior and could get involved with others in a more acceptable manner. He would always be willing to share and take turns with other children.

Subject #5 learned to better express himself in relating events. He could talk easily to other children and to adults. He would not always listen carefully.

Summary of Observations

Due to Subject #5's poor vision, a color presentation of the various shapes was made to help him relate more quickly to these forms. This lesson included the yellow circle, a blue square, and an orange triangle.

By the 12th lesson he seemed to be able to recognize his shapes successfully. He had difficulty tracing the shapes on the chalkboard, but this was felt to be the result of poor vision. Most of his squares and triangles had rounded corners.

After the 12th lesson, it was felt that Subject #5 was able to identify and name the circle, square, and triangle.

In the last lesson he could cover his eyes and name correctly the shape that he held in his hand. He was able to do this correctly without any coaching.

## Test Results

### Formboard

Subject #5 had no difficulty in putting the formboard together in the pre-test, second test, and final test.

### Tracing the Geometrical Shapes

Subject #5 was unable to trace the circle, square, and triangle in the pre-test.

In the second test, he was able to follow the dots more consistently on the circle but could not remain on the dots for the square and the triangle.

Subject #5 drew a smoother line around the circle, in the final test, but was unable to maintain contact with the dots around the square and triangle.

### Draw One Like It

Subject #5 was unable to copy a circle, square, or triangle in the pre-test.

In the second test, Subject #5 was able to copy a circle with a slight overlap. He was unable to copy a square or a triangle.

Subject #5 was able to copy a circle in the final test. He was unable to copy a square or a triangle.

### Draw a Circle, Square, and Triangle

Subject #5 was unable to draw a circle, square or triangle in the pre-test.

In the second test, Subject #5 was able to draw a circle and a

triangle but he was unable to draw a square.

In the final test, Subject #5 drew a circle that was very shaky and irregular. He was unable to draw a square or a triangle.

Taking the highest score by each rater from each trial, Subject #5 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 1 | 12 | 7 | 20 |
| Square | 2 | 5 | 3 | 10 |
| Triangle | 3 | 14 | 3 | 20 |
| Total | 6 | 31 | 13 | |

Taking the total score for each of the three tests, Subject #5 scored a total of 6 points out of a possible 75 points in the pre-test. He scored a total of 31 points out of a possible 75 points in the second test. This was a 25 point gain over the pre-test scores. He scored a total of 13 in the final test. This was a 7 point gain over his pre-test score but 18 points under his second test score.

Walk a Circle, Square, and Triangle

Subject #5 was unable to walk a circle, square or triangle in the pre-test. He moved randomly around the room trying to please, but not sure how he could do it.

Again, in the second test, he was not able to walk a circle, square or triangle.

In the final test, Subject #5 walked a circle in a clockwise direction. He did not respond with the proper movements when he was asked to walk a square and a triangle.

Psychological Report

Subject #5 was tested with the Revised Stanford-Binet, Form L-M (1960), on November 2, 1966. At this time his chronological age was 6 years and 2 months and his mental age was 2 years and 9 months. His I.Q. score was 39.

Due to the amount of time needed for this testing procedure, Subject #5 was not able to be tested by the psychologist at the end of the study.

## Evaluation of Progress

Subject #5 improved in his ability to identify a circle, square, and triangle, to trace the circle, to copy a circle, to draw a circle, and to walk a circle.

Subject #5 was unable to respond correctly when he was asked to trace the square and triangle, copy a square and triangle, draw a square and a triangle, and walk a square and a triangle.

Subject #5 remained the same in his ability to put the formboard together.

It appeared as though Subject #5 learned the circle in the 2nd, 3rd, and 4th test between the pre-test and the second test, but learned to walk a circle between the pre-test and final test.

The circle seemed to be the easiest shape for Subject #5 to learn.

## SUBJECT #6

### Background Data

Subject #6 was born on May 11, 1957 in Greensboro, North Carolina. His mother completed two years of college and his father was a college graduate. There were eight children in the family; four girls and four boys. One boy and three girls were older than Subject #6.

As a pre-school child, Subject #6 was often subjected to convulsions. Later as a result of medical treatment, he did not have the convulsions as often. It was noted by his father that Subject #6 would tend to have convulsions after a period of inactivity.

His classroom teacher rated his personal and social assets as below average.

Subject #6 was righthanded. Subject #6 was suspected to be mentally retarded but the cause of retardation was not known.

### Summary of Observations

Subject #6 was difficult to hear and understand because he never talked above a whisper.

In lesson #1, when the color-shape relationship was used, he responded to the color rather than the shape. It was still felt by the teacher that Subject #6 was learning the shapes.

In lesson #4, he was able to color the proper shape the proper color. He was also able to trace the figures on the board correctly.

At the end of the 13th lesson, he was giving consistent correct answers.

Although Subject #6 was usually very quiet and well behaved, he

had to leave one lesson because of misbehavior.

In lesson #31, he was able to close his eyes and identify the shapes by touch.

## Test Results

### Formboard

Subject #6 had no difficulty putting the formboard together in the pre-test, second test, or post-test.

### Tracing the Geometrical Shapes

In the pre-test, Subject #6 was unable to remain in contact with the dots consistently around the three figures. Each figure had one or two minor deviations.

He was able to follow the dots around the circle, square, and triangle in the second test. There were some very slight deviations, but the figures were closed and had no overlaps.

In the final test, the subject had some minor deviations from the dots. He was unable to trace the circle at the bottom, but very quickly came back to the dots. He was able to trace the square and triangle.

### Draw One Like It

In the pre-test, Subject #6 was able to copy a circle, square, and triangle with no major problems. His circle was not completely round, but it was closed and did not have an overlap.

Subject #6 was able to copy a circle and a triangle in the second test. For a square, he made a large rectangle.

Subject #6 correctly copied a circle, square, and triangle in the post-test.

Draw a Circle, Square, and Triangle

In the pre-test, Subject #6 was able to draw a circle, square, and triangle. Each of his first attempts resulted in a circle, but in his second attempt, he drew the figure that he had been asked to draw.

Subject #6 was able to draw a circle in the second test. For a square, he drew a triangle, and for a triangle, he drew a square.

In the final test, Subject #6 was able to draw a circle. He drew for a square a large triangle. For a triangle, he drew a circle.

Taking the highest score by each rater from each trial, Subject #6 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 15 | 17 | 21 | 53 |
| Square | 12 | 4 | 2 | 18 |
| Triangle | 13 | 4 | 1 | 18 |
| Total | 40 | 25 | 24 | |

Taking the total score from each test, Subject #6 scored a total of 40 points out of a possible 75 points in the pre-test. In the second test, he scored a total of 25 points out of a possible 75 points. Subject #6 scored a total of 24 points out of a possible 75 points in the final test. This was a decrease of 16 points from the pre-test scores.

Walk a Circle, Square, and Triangle

Subject #6 was righthanded. In the pre-test, he was unable to walk a circle, square, or triangle. When the verbal cues were given, he stood still.

In the second test, he was able to walk a circle in a counter-

clockwise direction but he repeated this same movement for the square and triangle.

Subject #6 was able to walk a circle in the final test. He walked in a counterclockwise direction. He was not able to respond correctly when he was asked to walk a square and a triangle.

Psychological Report

On September 9, 1963, Subject #6 was given the Revised Stanford-Binet, Form L-M (1960). At the time of the test, he was 6 years and 4 months old. Because Subject #6 had difficulty in talking, an I.Q. score in the forties was assumed.

Due to the amount of time needed for this testing procedure, Subject #6 was not tested at the end of this study.

## Evaluation of Progress

Subject #6 improved in his ability to match shapes by color and figure, to identify the circle, square, and triangle, to trace the circle, square, and triangle, and to walk a circle.

He was unable to respond correctly when he was asked to walk a square and a triangle.

Subject #6 remained the same in his ability to put the formboard together and to copy a circle, square, and triangle.

Subject #6 decreased in his ability to draw a circle, square, and triangle.

It appeared as though Subject #6 learned how to trace the shapes by the second test. He remained the same in his ability to copy the shapes and decreased in his ability to draw a square and triangle. He

learned how to walk a circle between the pre-test and the second test. The circle was the easiest figure for Subject #6 to learn.

## SUBJECT #7

### Background Data

Subject #7 was born in South Carolina on February 26, 1954. The mother completed the 7th grade. The parents were separated and the family was on welfare. There were five children in the family and he had a brother and a sister who were suspected to be mentally retarded.

He completed two years in a public school class and his teacher noted that he needed special care because of his immaturity.

An evaluation after the first year of special education, given by the classroom teacher, indicated that Subject #7 was a non-verbal boy who was clumsy in the performance of chores. He was extremely infantile. His coordination and muscular dexterity were very poor. A doctor noted that the difficulty may be due to something other than mental retardation.

Subject #7 was righthanded. He would talk only when he was coaxed.

It was noted by his classroom teacher that some improvement in self care skills had been accomplished.

### Summary of Observations

Subject #7 had to learn how to cooperate with a new person. He was first able to match shapes without verbalization. He would be given a shape and would have to match that to the one that was on the chalkboard. He was never able to make a direct match without some degree of

wandering first.

He was able to trace a figure that he was holding in his hand.

After eight lessons, he was able to give a verbal answer for the circle. The square and the triangle still seemed to confuse him.

In lesson #12, he was not able to respond when asked to hold up a shape that would match the one the teacher was holding.

Toward the middle of the study he seemed to slow down in his work and did not respond well.

About the 18th lesson, the class was asked to name a shape that was held up. He named the shape correctly. This was the first time that he had volunteered to do anything.

In the 24th lesson, he was asked to identify the shapes. He could not do this the first two times. The third time he was able to name all three shapes without any difficulty.

From this point on, he continued to make a few errors but he seemed to know all of the shapes without guessing.

In his last lesson, when the shapes were held behind the back and the eyes were closed, he could only name the circle correctly out of the three figures.

It was felt by his classroom teacher that Subject #7 could correctly identify the circle, square, and triangle at the end of the study. However, he would make periodic errors in identification.

He could not follow directions unless given constant repeated directions and supervision.

## Test Results

### Formboard

Subject #7 seemed unsure of what he was supposed to do, in the pre-test, when he was asked to put the formboard together. He had to move the shapes around before he could correctly put them in their proper places. He was able to do this, but it took him a long time.

In the second test, it took him about the same amount of time to put the formboard together as it did in the pre-test. Again, he made many errors before he could properly place the shape in the correct spot.

In the final test, he seemed to know what was required of him and he did it quite easily.

### Tracing the Geometrical Shapes

In the pre-test, Subject #7 was unable to consistently remain in contact with the dots around any of the figures. Although he was not able to remain in contact with the dots, he was able to make the shape that he was trying to trace.

Subject #7 was unable to remain consistently on the dots around the circle, square, and triangle in the second test. Again he was able to draw the general shape that he was required to trace.

In the final test Subject #7 was able to trace around the circle completely with only one slight deviation. He was unable to do this around the square. He was able to remain on the dots around two sides of the triangle, but was not able to trace the base line.

Draw One Like It

Subject #7 was unable to copy a circle, square, or triangle in the pre-test.

In the second test, Subject #7 copied a circle but he drew one side of the circle completely flat. He was unable to copy a square and a triangle.

In the final test, Subject #7 was able to copy a circle. He was unable to draw a square, although his figures now had an angle in them. He was unable to copy a triangle.

Draw a Circle, Square, and Triangle

Subject #7 was unable to draw a circle, square, or triangle in the pre-test. For a circle, he drew a small oval shape.

In the second test, he was unable to draw a circle, square, or triangle.

In the final test he was able to draw a circle and a triangle but was unable to draw a square.

Taking the highest score by each rater from each trial, Subject #7 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 2 | 5 | 17 | 24 |
| Square | 5 | 9 | 8 | 22 |
| Triangle | 4 | 6 | 12 | 22 |
| Total | 11 | 20 | 37 | |

Taking the total score from each test, Subject #7 scored a total of 11 points out of a possible 75 points in the pre-test. In the second test, he scored a total of 20 points out of a possible 75 points. This was a gain of 9 points over the pre-test score. In the final test,

Subject #7 scored a total of 37 points out of a possible 75 points. This was a 26 point gain over the pre-test score.

Walk a Circle, Square, and Triangle

In the pre-test, Subject #7 was unable to respond correctly when he was asked to walk a circle, square, or triangle. He did not make any movements.

In the second test, he moved one quarter of the way around the circle in a counterclockwise direction but did not complete this movement. For the square and the triangle he stood where he was and made no movement.

Subject #7 moved halfway around the circle when he was asked to walk a circle. When he was asked to walk a square, he walked a triangle. When he was asked to walk a triangle, he walked a triangle in a counterclockwise direction.

Psychological Reports

On September 13, 1962, Subject #7 was given the Revised Stanford-Binet, Form L-M (1960). At this time his chronological age was 8 years and 0 months. At this time it was impossible to obtain an I.Q. score.

On May 25, 1964, another attempt was made to give the Revised Stanford-Binet, Form L-M (1960) to Subject #7. The psychologist reported at this time that it was almost impossible to get his attention. In response to questions, he would reply: "I can't talk." She referred the child to Chapel Hill Memorial Hospital for further testing because she felt that it was wrong to assume that mental retardation and only mental retardation was the problem.

On October 10, 1967, Subject #7 was again given the Revised Stanford-Binet, Form L-M (1960). At this time he was 13 years old. His mental age was 2 years and 4 months and his I.Q. was an estimated 30.

Due to the amount of time needed for this testing procedure, Subject #7 was not tested at the end of this study.

Evaluation of Progress

Subject #7 improved in his ability to identify and name the circle, square, and triangle, to put the formboard together, to trace the circle, to copy a circle, and to walk a circle and a triangle.

Subject #7 showed no improvement in his ability to trace the square and triangle, to copy a square and a triangle, to draw a square and a triangle, and to walk a square.

It appeared as though the circle was the easiest figure for this subject to learn. It seemed as though Subject #7 was able to learn the concept of the circle between the pre-test and the post-test.

SUBJECT #8

Background Data

Subject #8, a mongoloid child, was born in Greensboro, North Carolina, on September 8, 1955. Her father completed the sixth grade and her mother completed the ninth grade. She was living with her foster mother who was a maid and had completed the twelfth grade. There were four children in the family and she had two older brothers.

Subject #8 was righthanded. She was suspected of being mentally retarded, but the cause of mental retardation was not known.

Social and personal assets as rated by her classroom teacher were

below average.

Her classroom teacher stated that there had been some signs of independence and learning of self care skills in the past few years. Most of the time she seemed content to sit at her desk and do nothing. She would talk only after she had been spoken to a number of times.

Summary of Observations

Subject #8 learned the terminology quickly, but never learned the relationship between the word and the shape. Her most frequent response was circle. She said square sometimes but seldom responded with triangle.

It seemed at times that she knew the circle, but this was seldom backed up with any correct action from her. She did seem to want to please, but she did not have the correct answers.

In the twenty-fourth lesson, Subject #8 was asked to leave the study by the classroom teacher because it was felt that she was not learning any of the material but just taking up time. At this time, she did not say anything but just grunted and acted displeased. She seemed unhappy that she was not allowed to go to her lesson. After a lapse of two lessons she was again admitted to the program.

When the objects were held behind the back and her eyes were closed, she was unable to respond with the correct names for the shapes.

## Test Results

### Formboard

In the pre-test, Subject #8 did not appear to know what was expected of her. Her attention span was short and she had to be coaxed

to finish. She was not able to differentiate between the circles and the triangles.

In the second test, she was not able to fit the formboard together. She had trouble with the small circle, square, and triangle and could not fit them in their proper places.

In the final test, she worked better with these figures and although she did mix up the circle, square, and triangle, she was able to find their proper place with trial and error.

Tracing the Geometrical Shapes

In the pre-test, Subject #8 was unable to trace the circle, square, or triangle. She did not attempt any movement around the triangle and she only made one or two marks on the circle and the square.

In the second test, she was not able to complete any of the figures. She made marks that were randomly placed around each of the shapes but she was not able to follow the dots consistently.

In the final test, Subject #8 was able to trace the circle almost all of the way around. The figure was not closed. She was not able to trace the square or the triangle.

Draw One Like It

She was unable to copy a circle, square, or triangle in the pre-test. Her marks were very small and were placed randomly around the papers.

In the second test, Subject #8 made a very small circle. She repeated these same marks for the square and the triangle.

In the final test, Subject #8 drew a large figure shaped like a

lima bean for a circle. This was the first time that she had made such a large drawing. For the square and triangle, she again drew very small half circles.

Draw a Circle, Square, and Triangle

In the pre-test, Subject #8 was unable to draw a circle, square, or triangle. The marks she made were very small and could hardly be seen on the paper.

Subject #8 was unable to draw a circle, square, or triangle in the second test.

In the final test, she drew a shape about the size of a half dollar but the figure was completely flat on one side. She was unable to draw a square or a triangle in the final test.

Taking the highest score by each rater from each trial, Subject #8 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 3 | 9 | 9 | 21 |
| Square | 2 | 4 | 2 | 8 |
| Triangle | 1 | 4 | 2 | 7 |
| Total | 6 | 17 | 13 | |

Taking the total score from each test, Subject #8 scored a total of 6 points out of a possible 75 points in the pre-test. In the second test, she scored a total of 17 points out of a possible 75 points. This was an 11 point gain over the total in the pre-test. In the final test, Subject #8 scored a total of 13 points out of a possible 75 points. This was a 7 point gain over her pre-test score but was 4 points less than her second test score.

Walk a Circle, Square, and Triangle

Subject #8 was unable to walk a circle, square, or triangle in the pre-test. She stood where she was.

In the second test and final test, she could not respond correctly to the verbal cues. She made no attempt to make any movement. She did not seem to understand what she was supposed to do.

Psychological Reports

On May 31, 1962, Subject #8 was given the Revised Stanford-Binet, Form L-M (1960). At this time her chronological age was 6 years and 9 months and her mental age was 1 year and 6 months. Her I.Q. ranged between 20 and 30.

Due to the amount of time needed for this testing procedure, Subject #8 was not tested at the end of this study.

## Evaluation of Progress

Subject #8 improved in her ability to identify the circle, to put the formboard together, to trace a circle, to copy a circle, and to draw a circle.

Subject #8 showed no improvement in her ability to trace a square or triangle and to draw a square and triangle.

Subject #8 was unable to respond correctly when she was asked to identify the square and triangle, copy a square and triangle, and walk a circle, square, and triangle.

It appeared as though the circle was the easiest figure for this subject to learn and it appeared as though she learned this concept between the pre-test and the final test.

SUBJECT #9

Background Data

Subject #9 was born on October 17, 1958 in Greensboro, North Carolina. His mother's occupation was a housewife and his grandmother worked in a laundry. The father did not live in the home.

The economic status of the family was listed as moderate, and Subject #9 was the only child in the family.

Subject #9 was lefthanded.

Although the child was suspected to be mentally retarded, the cause of retardation was not known.

His classroom teacher rated his personal and social assets below average for the two years that he was at the Charles Moore Elementary School.

After his first year at school, it was said by the classroom teacher that he had grown considerably socially and emotionally. After his second year at school, his classroom teacher said that he had made a great deal of progress in all areas and showed a definite sign of a need for re-evaluation of his ability.

Summary of Observations

Extremely eager to please, he would respond without knowing the correct answers. He would also respond for the children when he was not asked.

In lesson #2, he was able to match the shapes that he was holding to the ones that were drawn on the chalkboard.

He needed help to trace the figures on the board in lesson #3. He

also needed help in identifying the proper shape to color.

By lesson #13, he was beginning to respond more frequently with the correct answers. It was felt by the classroom teacher that he would sometimes give wrong answers for the attention because when he was asked the second time, he would respond correctly.

It was felt by the classroom teacher that Subject #9 could correctly identify and name the circle, square, and triangle.

In lesson #31, he was able to identify the objects when he was holding them but could not see them.

It was noted by the classroom teacher that Subject #9 showed off so much that it was difficult to know exactly what he did know.

## Test Results

### Formboard

Subject #9 had no difficulty putting the formboard together in the pre-test, second test, or post-test.

### Tracing the Geometrical Shapes

The subject was unable to trace a circle in the pre-test, but was successful in tracing the square and triangle. In the second and final tests, he was able to trace all the figures.

### Draw One Like It

Subject #9 was able to copy a circle in the pre-test. He was unable to copy a square or a triangle.

In the second test, he was able to copy a circle, square, and triangle. These figures were not perfect in shape, but they could be

identified for a circle, square, and triangle.

In the final test, he was able to copy a circle. He drew a triangle when he was shown a square and he could not copy a triangle when he was shown a triangle.

Draw a Circle, Square, and Triangle

In the pre-test, Subject #9 was able to draw a circle, square, and triangle.

In the second test, he was able to draw a circle but he drew a triangle for a square. He was able to draw a triangle when he was asked to draw a triangle.

In the final test, he was able to draw a circle and a triangle but he could not draw a square.

Taking the highest score by each rater from each trial, Subject #9 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 18 | 19 | 18 | 55 |
| Square | 18 | 4 | 4 | 26 |
| Triangle | 21 | 18 | 14 | 53 |
| Total | 57 | 41 | 36 | |

Taking the total score from each test, Subject #9 scored a total of 57 points out of a possible 75 points in the pre-test. In the second test, he scored a total of 41 points out of a possible 75 points. This was a decrease of 16 points from the pre-test score. He scored a total of 36 points out of a possible 75 points in the final test and this was a decrease of 21 points from the pre-test score.

Walk a Circle, Square, and Triangle

The pre-test indicated that Subject #9 was not able to respond correctly to the commands of walk a circle, square, or triangle. He responded with no movement at all.

In the second test, he was unable to walk a circle, square, or triangle.

Subject #9 was able to walk a circle in a clockwise direction in the final test, although one side of the figure was fairly flat. He could not walk a square. He was able to walk a triangle in a counter-clockwise direction, but the top of the figure was flat.

Psychological Report

On August 30, 1965, Subject #9 was given the Revised Stanford-Binet, Form L-M (1960). At this time his chronological age was 6 years and 10 months and his mental age was 2 years and 4 months. His I.Q. was 34.

Due to the amount of time needed for this testing procedure, Subject #9 was not tested at the end of this study.

## Evaluation of Progress

Subject #9 improved in his ability to identify the circle, square, and triangle, to copy a circle, and to walk a circle and triangle.

Subject #9 remained the same in his ability to put the formboard together, to trace a circle, square, and triangle, and to copy a circle.

He showed a decrease in his ability to copy a square and triangle, to draw a circle, square, and triangle, and to walk a square.

It appeared as though the subject might have been familiar with

these shapes prior to the study although his learning curve seemed to be erratic.

## TREATMENT #2

The four girls and four boys in this group were taught by the writer. Each child was taught three times per week for a twelve week session. One lesson at the beginning of the study, two during the study, and two at the end of the study were used to test the children.

The children had an average of 30 lessons. The concepts of the circle, square, and triangle were introduced in almost every lesson. The children were given simple whole body movements around the geometrical shapes. The amount of work on a particular shape varied for each child. The children were encouraged to make the square and triangle from the material provided as soon as they were able.

After the 20th lesson, as soon as the child appeared as though he could identify the large figures, small objects in the shapes of circles, squares, and triangles were introduced to him. He was encouraged to identify these objects by feeling and tracing them with his fingers. This part of the lesson was presented to the child after he had completed his large motor patterns around the figures on the floor.

The diamond and rectangle were later introduced to three of the children.

## SUBJECT #10

### Background Data

Subject #10 was born in Greensboro, North Carolina, on October 25, 1956. His father worked as a warehouseman and was a college graduate.

His mother was a housewife. There were eight children in the family. Three girls and three boys were older than Subject #10.

Subject #10 was lefthanded. He was suspected to be mentally retarded, but the cause of mental retardation was not known.

Subject #10, a mongoloid child, was hospitalized shortly after his birth because it was discovered that he had a spot on his lung. He spent the major part of his first year in a tuberculosis sanitarium.

The evaluation of social and personal assets as rated by his classroom teacher was below average.

After his first year at school, it was said that he was an emotionally well adjusted child and he seemed competent in self care skills. In his second year, he continued to show improvement in all areas of adjustment. After his third year, it was said by his classroom teacher that he was a well adjusted child.

Summary of Observations

Subject #10 was a boy who was constantly in a good mood. He was a very pleasant little boy and was continually thinking of ways in which he could outwit the teacher. He pulled small jokes whenever he could.

He was unable to respond correctly to the commands of walk forward, walk backward and sideways until the 8th lesson. Because of his breathing problem, he was not given the chance to do much hopping and jumping around the figures.

He was slow in his movements and he needed a definite point to travel to or he would not complete the movement around the figures. In the first two lessons, he lost his balance a number of times while moving

around the figures, but this improved by the end of the study.

He was unable to bounce the ball with a great deal of success, although he was able to catch the ball quite consistently by the end of the study.

It seemed as though Subject #10 would purposely give wrong answers for attention but this was not known for sure.

He was not able to identify the small geometrical shapes that were put on the table in the 25th lesson.

By his last lesson it was felt that he knew the large shapes on the floor and that he could name the small geometrical shapes that were circles and squares. He was not able to pick out the small objects other than the hanger, that were triangles. He could respond correctly to the commands of walk forward, walk backward, hop, and jump. He could not respond correctly to the command of walk sideways. His movements seemed more relaxed at the end of the study as compared to his movements at the beginning of the study.

He was able to make a triangle and the square, out of the materials provided, on the floor.

## Test Results

### Formboard

Subject #10 had no difficulty in putting the formboard together in the pre-test, second test, and post-test.

### Tracing the Geometrical Shapes

In the pre-test, Subject #10 was unable to maintain contact with the dots around the circle. The shape he made was circular but he did

not stay on the dots. He was unable to follow the dots consistently around the square and the triangle.

In the second test, Subject #10 was able to follow the dots around the circle, square, and triangle consistently.

Subject #10 was unable to follow the dots around the circle in the final test. He was able to trace the square and the triangle with only slight deviations.

Draw One Like It

In the pre-test, Subject #10 was able to copy a circle and a square. He was not able to copy a triangle.

In the second test and post-test, he was able to copy a circle and a square. Again he was not able to copy a triangle.

Draw a Circle, Square, and Triangle

In the pre-test, Subject #10 was able to draw a circle, but the circle was flat on one side. He also drew a square, but it was a very small figure at the top of the paper. He was unable to draw a triangle.

In the second test, he was able to draw a circle and a square but was unable to draw a triangle.

Subject #10 was able to draw a circle, square, and triangle in the final test. His triangle had rounded corners but it could be distinguished as a triangle.

Taking the highest scores by each rater from each trial Subject #10 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 20 | 18 | 22 | 60 |
| Square | 11 | 15 | 17 | 43 |
| Triangle | 2 | 3 | 12 | 17 |
| Total | 33 | 36 | 51 | |

Taking the total score from each test, Subject #10 scored a total of 33 points out of a possible 75 points in the pre-test. In the second test, he scored 36 points out of a possible 75 points. In the final test, he scored a total of 51 points out of a possible 75 points. This was an 18 point gain over the pre-test score.

Walk a Circle, Square, and Triangle

Subject #10 did not respond with any correct movements when he was asked to walk a circle, square, or triangle in the pre-test or second test.

In the final test, he walked three quarters of the way around a circle moving in a clockwise direction. He did not complete this circle. He repeated the same movement when he was asked to walk a square and a triangle.

Psychological Reports

On April 17, 1964, Subject #10 was given the Revised Stanford-Binet, Form L-M (1960). At this time, his chronological age was 7 years and 6 months. His mental age was 3 years and 7 months. His I.Q. score was 44.

Subject #10 was again tested, using the same test, on November 28, 1967. His chronological age, at this time, was 11 years and 1 month and his mental age was 4 years and 1 month. His I.Q. score was 41. This

was a three point drop from the test results in 1964.

On May 17, 1968, two days after the conclusion of this study, Subject #10 was again given the same test as above. His chronological age was 11 years and 7 months and his mental age was 4 years and 9 months. His I.Q. was 46. This was a 5 point gain over the test score from his 1967 test, and a 2 point gain over the 1964 test results.

## Evaluation of Progress

Subject #10 improved in his ability to respond correctly to the word commands of walk forward, to walk backward, hop and jump, to make a square and a triangle from the materials available, to identify correctly the circle, square, and triangle that were placed on the floor, to correctly name the circle, square, and triangle, to identify the small circular and square geometrical shapes, to maintain his balance while walking around the geometrical shapes, to trace the circle, square, and triangle, and to draw a circle, square, and triangle.

Subject #10 was unable to respond correctly when he was asked to walk sideways, to walk a circle, square, and triangle, and to identify the small geometrical shape of a triangle.

Subject #10 showed no improvement in his ability to put the form-board together or to copy a circle, square, or triangle.

It appeared as though Subject #10 learned to trace the three figures by the second test. He was able to draw a triangle in the final test. It appeared as though Subject #10 was familiar with the circle and square prior to this study.

SUBJECT #11

Background Data

Subject #11 was born in Greensboro, North Carolina, on March 16, 1960. His parents were both college graduates.

At three years, he was referred to Chapel Hill because of delayed speech and retardation of body development. At this time he was diagnosed as being an autistic child. At the time of his entrace into the first grade, this condition had improved considerably although his speech was still rudimentary.

Subject #11 was righthanded. Although the child appeared to be mentally retarded, the cause of retardation was not known.

There were six children in the family. He was next to the youngest child but was the oldest boy. At the end of the first year, his teacher evaluated his progress as still being non-verbal, but an attempt had been made by him to make some sounds. He made below average in the evaluation of personal and social assets as rated by his classroom teacher. It was also noted that he was often very restless. His classroom teacher for 1967-1968 had stated that Subject #11 had a show of rapid growth in the area of speech. He learned many words and would communicate with others. He could also answer questions.

An extensive testing program had been carried out on Subject #11 in the spring of 1968, but the results were impossible to obtain at the end of this study.

Summary of Observations

Subject #11 was a big boy for his age. He was very cooperative

and showed much enthusiasm. He sometimes moved faster than he was capable of moving. His movements were big and awkward.

When he first came into the lesson, he was unable to identify the circle, square, or triangle. He was not able to make these figures with the boards that were available. He could not respond correctly to the verbal cues of walk forward, walk backward or sideways when he was asked to move. He could hop and jump but his movements were very limited. He was unable to pronounce the names of the geometrical shapes when they were introduced to him.

He was able to work quite well with the ball. He could bounce it without missing it and he could catch and throw it easily.

He did not know how to play tag but he was able to pick this up shortly after it was introduced.

By lesson #13, he knew the circle, square, and triangle. The diamond was introduced. He could not identify the small geometrical shapes when they were introduced in the 23rd lesson.

In lesson #23, the rectangle was introduced because it was felt that Subject #11 knew the circle, square, triangle, and diamond.

At the end of the study, it was felt that Subject #11 could respond correctly to the verbal cues of walk forward, backward, sideways, hop and jump, although his movements were still large and awkward.

He could identify the circle, square, triangle, diamond, and rectangle. He could also make the square, triangle, rectangle, and diamond with the boards that were available.

He was able to pick out and name the objects on the table and these objects included circles, squares, triangles, and rectangles. He

had improved in his ability to pronounce circle, square, triangle, diamond, and rectangle.

## Test Results

### Formboard

Subject #11 had no difficulty putting the formboard together in the pre-test, second test, and post-test.

### Tracing the Geometrical Shapes

In the pre-test, Subject #11 was able to remain in contact with the dots around the circle and the triangle. He was unable to remain in contact with the dots around the square.

In the second test, he was able to follow the dots around the circle, square, and triangle but with minor deviations.

In the final test, Subject #11 was able to trace the circle, square, and triangle with no difficulty.

### Draw One Like It

In the pre-test, Subject #11 was unable to copy a triangle. In the second test and final test, Subject #11 was able to copy a circle, square, and triangle.

### Draw a Circle, Square, Triangle, Diamond, and Rectangle

In the pre-test, Subject #11 was unable to draw a circle and a triangle. He was able to draw a square but the corners were rounded. The diamond and rectangle had not yet been introduced.

In the second test, he was able to draw a circle, square, triangle, and diamond. The rectangle had not yet been introduced.

Subject #11 was able to draw a circle, square, triangle, diamond, and rectangle in the final test.

Taking the highest score by each rater from each trial, Subject #11 scored the following scores out of a possible 25 for the circle, square, and triangle.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 4 | 13 | 17 | 34 |
| Square | 15 | 17 | 20 | 52 |
| Triangle | 4 | 14 | 21 | 39 |
| Total | 23 | 44 | 58 | |
| Diamond | | 14 | 19 | 33 |
| Rectangle | | | 23 | 23 |

Taking the total score from each test, Subject #11 scored a total of 23 points out of a possible 75 points in the pre-test. In the second test, he scored a total of 44 points out of a possible 75 points. This was a 21 point gain over his pre-test score. In the final test, Subject #11 scored a total of 58 points out of a possible 75 points. This was a 35 point gain over the score in the pre-test.

Subject #11 was also able to draw a diamond and a rectangle at the end of this study.

Walk a Circle, Square, Triangle, Diamond, and Rectangle

The pre-test indicated that Subject #11 was unable to respond correctly to the verbal cues of walk a circle, square, and triangle.

In the second test, Subject #11 was able to walk a circle, square, triangle, and diamond. He moved clockwise around these shapes.

Subject #11 was able to walk a circle, square, triangle, diamond, and rectangle in the final test. He moved in a counterclockwise

direction for each of these shapes.

Psychological Reports

On April 14, 1967, Subject #11 was given the Revised Stanford-Binet, Form L-M (1960). At this time his chronological age was 7 years and 1 month. Due to the fact that the child could not speak, he was given an I.Q. score between 40 and 50. This was called a functional I.Q. and was not an official or standardized I.Q. score.

On May 17, 1968, two days after the conclusion of this study, Subject #11 was again given the above test. At this time his I.Q. score was estimated to be 41.

## Evaluation of Progress

Subject #11 improved in his ability to respond correctly to the word commands of walk forward, backward, sideways, hop and jump, to identify and name the circle, square, triangle, diamond, and rectangle, although these words were not always pronounced clearly. He could make, from the materials available, the square, triangle, diamond, and rectangle, and could identify by name the small geometrical shapes. He was able to maintain balance while walking around the circle, square, triangle, diamond, and rectangle. He improved in his ability to trace the square, draw a circle, triangle, diamond, and rectangle, and to walk a circle, square, triangle, diamond, and rectangle.

Subject #11 remained the same in his ability to put a formboard together, to trace the circle and triangle, to copy a circle, square, and triangle, and to draw a square.

It appeared as though Subject #11 learned to trace the square and

copy the triangle between the pre-test and the second test. He learned to draw a circle, triangle, and diamond by the second test, and learned to draw a rectangle between the second test and final test.

It appeared as though Subject #11 improved the most between the pre-test and the post-test. It was felt that Subject #11 could have learned other shapes also at the same time that he was learning these five shapes.

## SUBJECT #12

### Background Data

Subject #12 was born in Greensboro, North Carolina, on November 13, 1958. There were five children in the family. He had an older brother and an older sister. His father was a laborer and completed high school. His mother was a housewife and completed high school.

He did go to grade one at a public school but his teacher noted at the end of that year that his interest span was very short. He was also slow in learning to follow simple directions.

He had received below average marks on an evaluation of social and personal assets as rated by his classroom teacher.

After his first year in special education, his classroom teacher noted that Subject #12 was shy but had improved in his behavior. He seemed to enjoy being in the special class.

Subject #12 was righthanded, and the cause of mental retardation was not known.

### Summary of Observations

Subject #12 was not able to identify the circle, square, or

triangle when he first came into his lessons. He could not respond correctly to the commands of walk forward, backward or sideways, but he did know how to hop and jump. He was very stiff in his movements and he would not complete the same movement around the whole figure. He was not able to make any of the figures correctly from the materials provided. He did not know how to play tag although he learned this very quickly. He was not able to bounce the ball more than once.

In his first lesson, he was unable to jump more than once, but gradually he built this up until he could jump twice in a row. Finally, in Lesson #21, he jumped all the way around the figure that he had been working on without stopping.

He could not identify the small objects on the table when they were first introduced in Lesson #22.

At the time of his last lesson, it was felt that Subject #12 knew how to respond correctly when he was asked to walk forward, backward, sideways, hop and jump. He could also complete the required movements around the whole figure without stopping. He could identify the circle, square, and triangle although he still had difficulty naming the small geometrical shapes on the table. At times, he named these correctly.

He was able to move around the figures without losing his balance, although his body movements were still tense.

## Test Results

### Formboard

Subject #12 had no trouble putting the formboard together in the pre-test, second test, and final test.

Tracing the Geometrical Shapes

In the pre-test, Subject #12 was able to remain in contact with the dots on the circle with only minor deviations. He was also able to follow the dots around on the square and the triangle.

In the second test, he was unable to remain in contact with the dots around the circle except at the six o'clock and twelve o'clock positions. He was able to stay in contact with the dots around the square but he had a slight overlap. He was able to remain on the line on the left side of the triangle but was not able to follow the dots on the base line or around the right line.

In the final test, Subject #12 was able to follow the dots around the circle, square, and triangle with only slight deviations. He closed all the figures and had no overlaps.

Draw One Like It

In the pre-test, Subject #12 was able to copy a circle, square, and triangle. He was able to copy the circle, square, and triangle again in the second test and final test.

Draw a Circle, Square, and Triangle

In the pre-test, Subject #12 was able to draw a circle. He drew a triangle for a square and drew a square when he was asked to draw a triangle.

In the second test, Subject #12 was able to draw a circle. Again he drew a triangle for a square. He was able to draw a triangle when he was asked to draw this figure.

Subject #12 was able to draw a circle, square, and triangle in the final test.

Taking the highest score by each rater from each trial, Subject #12 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 18 | 19 | 19 | 56 |
| Square | 4 | 4 | 22 | 30 |
| Triangle | 4 | 18 | 20 | 42 |
| Total | 26 | 41 | 61 | |

Taking the total score in each test, Subject #12 scored a total of 26 points out of a possible 75 points in the pre-test. In the second test, he scored a total of 41 points out of a possible 75 points. This was a 15 point gain over the score in the pre-test. In the final test, Subject #12 scored a total of 61 points out of a possible 75 points. This was a 35 point gain over the score in the pre-test.

Walk a Circle, Square, and Triangle

The pre-test indicated that Subject #12 was unable to walk a circle, square, or triangle.

During the second test, Subject #12 turned around where he was standing when he was asked to walk a circle. He moved back and forth in a straight line for a square and a triangle.

In the final test, Subject #12 walked a circle in the counter-clockwise direction. He was able to walk a square, but he had one corner that was slightly rounded. He walked a triangle in the counterclockwise direction.

Psychological Reports

Subject #12 was given the Revised Stanford-Binet, Form L-M (1960), on January 7, 1966. At this time his chronological age was 7 years and 1 month. His mental age was 2 years and 10 months. His I.Q. score was 35.

On May 17, 1968, two days after the conclusion of this study, Subject #12 was again given the Revised Stanford-Binet, Form L-M (1960). At this time his chronological age was 9 years and 6 months and his mental age was 5 years and 1 month. His I.Q. score was 53. This was an 18 point gain over his previous I.Q. score.

Evaluation of Progress

Subject #12 improved in his ability to respond correctly to the verbal cues of walk forward, walk backward, walk sideways, to move completely around the shapes without stopping, to maintain his balance while moving around the geometrical shapes, to make a square and triangle from the materials, to name and identify the circle, square, and triangle that were put on the floor. At times, he was also able to identify the small geometrical objects correctly. He could draw a square and a triangle, and walk a circle, square, and triangle.

Subject #12 remained the same in his ability to put the formboard together, to trace the circle, square, and triangle, to copy a circle, square, and triangle, and to draw a circle.

Subject #12 showed an eighteen point gain over his previous I.Q. score.

It appeared as though most of the improvement occurred between the pre-test and the final test.

## SUBJECT #13

### Background Data

Subject #13 was born in Greensboro, North Carolina, on August 23, 1957. She was righthanded. Although she was suspected to be mentally retarded, the cause of retardation was not known.

Her mother was deceased and the child was living with a disabled uncle who was unemployed. She had three brothers all of whom were older than she. She lived in a low economic community.

She showed average on the evaluation of social and personal assets as rated by her classroom teacher. At the end of last year, Subject #13's home situation had changed and she became a happy little girl. Her personality blossomed and she seemed to be a happy, well cared for child. This was noted by her classroom teacher.

This was her first year at the Charles Moore Elementary School and it was noted by her new classroom teacher that Subject #13 had taken several months to relate and feel at ease in the school. She had shown good progress in relating to other children. She played with others and enjoyed their company. She needed continued encouragement to talk and tell about the things that she heard and saw. She had shown improvement, but still needed to express herself better. She seldom volunteered information and quite often would not answer questions.

Summary of Observations

Subject #13 could not respond correctly to the verbal cues of walk forward, walk backward, and walk sideways in her first lesson. She was able to do this in lesson #4. She was able to hop and jump in the first lesson. She lost her balance a number of times when she moved around the figures. She was unable to make any of the figures on the floor with the material that was available but she was able to do this by her 9th lesson. She would not complete a movement around the figures unless she was constantly reminded.

She was unable to name any of her body parts and was not able to discriminate between her left and right side of the body. These concepts were not continued after lesson #6.

In lesson #21, she was unable to name any of the small geometrical shapes on the table. She was able to name them correctly after lesson #27.

In her last lesson, she was able to walk forward, backward, and sideways when asked to do so. She could also hop and jump. She did not complete a movement around the figure unless she was reminded but she was able to move more easily than she had at the beginning of the study. She could also identify and name the circle, square, and triangle.

## Test Results

### Formboard

Subject #13 had no difficulty with the formboard at the pre-test, second test, and post-test.

Tracing the Geometrical Shapes

In the pre-test and second test, Subject #13 was unable to remain in contact with the dots consistently around the circle, square, and triangle.

Subject #13 was able to trace the circle in the final test. She had minor deviations on the square and the triangle. These figures were closed and had no overlaps.

Draw One Like It

Subject #13 was unable to copy a circle, square, or triangle in the pre-test.

In the second test she drew a circle that had one flat side but she was able to copy a square. She was unable to copy a triangle.

Subject #13 was able to copy a circle, square, and triangle. The triangle had one rounded side and a ninety degree angle.

Draw a Circle, Square, and Triangle

In the pre-test, Subject #13 was unable to draw a circle, square, or triangle.

Subject #13 drew a circle with a flat side in the second test. She was able to draw a square but she could not draw a triangle.

In the final test, Subject #13 was unable to draw a circle and a triangle. She was able to draw a square.

Taking the highest score by each rater from each trial, Subject #13 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 3 | 8 | 2 | 13 |
| Square | 3 | 16 | 13 | 32 |
| Triangle | 2 | 1 | 3 | 6 |
| Total | 8 | 25 | 18 | |

Taking the total score from each test, Subject #13 scored a total of 8 points out of a possible 75 points in the pre-test. In the second test, she scored a total of 25 points out of a possible 75 points. This was a 17 point gain over the score in the pre-test. In the final test she scored a total of 18 points out of a possible 75 points. This was a 10 point gain over the score in the pre-test. It was 17 points under the score obtained in the second test.

Walk a Circle, Square, and Triangle

Subject #13 indicated in the pre-test that she did not know how to walk a circle, square, or triangle.

In the second test, she responded by walking a circle in a clockwise direction for all three shapes.

In the post-test, she was able to walk a circle in the clockwise direction. She walked a figure that was rectangular in shape for a square, and walked a triangle in the clockwise direction.

Psychological Reports

On December 14, 1964, Subject #13 was given the Revised Stanford-Binet, Form L-M (1960). At this time her chronological age was 7 years and 4 months and her mental age was 3 years and 1 month. Her I.Q. score was 40.

On May 15, 1968, one day after the conclusion of this study,

Subject #13 was again given the Revised Stanford-Binet, Form L-M (1960). At this time her chronological age was 10 years and 10 months and her mental age was 4 years and 10 months. Her I.Q. score was 47. This was a 7 point gain over her previous I.Q. score.

## Evaluation of Progress

Subject #13 improved in her ability to respond correctly to the verbal cues of walk forward, walk backward, and sideways. She moved easily around the figures and was able to make the square and triangle from the material provided. She could name the small geometrical shapes on the table, and could identify and name correctly the circle, square, and triangle that were placed on the floor. She was able to trace the circle, square, and triangle, copy a circle, square, and triangle, and draw a square. She also was able to walk a circle, square, and triangle without visual cues.

Subject #13 was unable to respond correctly when she was asked to draw a circle and a triangle.

Subject #13 remained the same in her ability to put the formboard together. She still had to be reminded to move around the whole figure.

It appeared as though Subject #13 learned to trace between the pre-test and the post-test. She learned to copy a circle and a square between the pre-test and second test and the triangle between the pre-test and the second test and showed improvement in her ability to walk a circle, square, and triangle between the pre-test and post-test.

SUBJECT #14

Background Data

Subject #14 was born in Greensboro, North Carolina, on January 12, 1959. Subject #14 was the oldest of three children. Each of the three girls had a different father, none of whom were married to the mother. The subject lived in a low economic community.

Surgery for a clubfoot was performed when the child was three weeks old. The child wore orthopedic shoes.

Although the child appeared to be mentally retarded, the cause of retardation was not known.

She had received below average in the evaluation of social and personal assets as marked by her classroom teacher. After her first year in the special education class, her teacher said that she had shown some progress in her work but that she often gave up without a great deal of effort.

After this year in school, her teacher stated that Subject #14 had made a marked degree of progress in relating to other people. She was much more a leader and enjoyed playing the role of an adult. She got along well with classmates and she would share and take turns with little encouragement.

Summary of Observations

Subject #14 gave the appearance that she was glad that she could come into her lesson but she was often uncooperative until the last part of the study.

She was not able to respond to the verbal cues of walk forward,

backward, and sideways, although she could hop and jump in the first lesson.

She was not able to recognize or make the shapes of the figures during the first few lessons. After lesson #18 she was able to make a triangle and this skill continued throughout the rest of the study. Lesson #18 was the only time that she was able to make a square by herself. After this lesson she could put two or three of the boards down correctly but she never completely made a closed square again.

She lost her balance a number of times around the figures. As soon as she was told to look where she was walking, her balance improved.

When introduced to the small objects in lesson #20, she was unable to identify any of them correctly.

In her last lesson, she could walk forward, backward, and sideways although she still had some trouble with her balance. She said that she did not know how to jump although it was felt that she knew how to jump and hop. She could also identify the three different geometrical objects on the table. She was able to recognize and name the circle, square, and triangle that had been placed on the floor.

## Test Results

### Formboard

Subject #14 had no difficulty putting the formboard together in the pre-test, second test, or post-test.

### Tracing the Geometrical Shapes

In the pre-test, Subject #14 was unable to follow the dots around the circle, square, or triangle.

In the second test, Subject #14 was able to trace the circle but she was unable to follow the dots around the square and the triangle.

Subject #14 was unable to trace the circle, square, and triangle in the final test.

Draw One Like It

In the pre-test, Subject #14 was able to copy a circle. She was unable to copy a square or a triangle.

In the second test, she was able to copy a circle, square, and triangle.

Subject #14 was able to copy a circle in the final test. When asked to copy a square she drew a triangle, and when asked to copy a triangle, she drew a square.

Draw a Circle, Square, and Triangle

Subject #14 was able to draw a circle. She was unable to draw a square or a triangle in the pre-test.

In the second test, Subject #14 was able to draw a circle and a triangle, but she was unable to draw a square.

Subject #14 was able to draw a circle and a triangle in the post-test. Although she was not able to complete a square, she drew three straight sides with one rounded side.

Taking the highest score by each rater from each trial, Subject #14 scored the following scores out of a possible 25.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 17 | 16 | 21 | 54 |
| Square | 2 | 10 | 10 | 22 |
| Triangle | 2 | 13 | 18 | 33 |
| Total | 21 | 39 | 49 | |

Taking the total score from each test, Subject #14 scored a total of 21 points out of a possible 75 points in the pre-test. In the second test, she scored a total of 39 points out of a possible 75 points. This was an 18 point gain over the score in the pre-test. In the final test, she scored a total of 49 points out of a possible 75 points. This was a 28 point gain over the pre-test score.

Walk a Circle, Square, and Triangle

Subject #14 was able to walk a circle in a counterclockwise direction in the pre-test. She was unable to respond correctly when she was asked to walk a square and a triangle.

In the second test, Subject #14 walked a shape for a circle in which both the top and bottom were flat and the ends were rounded. She was able to walk a square in a clockwise direction. She walked a circle when she was asked to walk a triangle.

In the post-test, she was unable to walk any of the three shapes.

Psychological Reports

On October 6, 1965, Subject #14 was given the Revised Stanford-Binet, Form L-M (1960). At this time her chronological age was 6 years and 9 months and her mental age was 3 years and 9 months. Her I.Q. score was 44.

Subject #14 was again given the Revised Stanford-Binet, Form L-M

(1960), on May 15, 1968, one day after the conclusion of this study. Her chronological age at this time was 9 years and 4 months and her mental age was 4 years and 2 months. Her I.Q. score was 44. This was the same as her previous score.

Evaluation of Progress

Subject #14 improved in her ability to respond correctly to the verbal cues of walk forward, walk backward, and sideways. She was able to make a triangle from the materials available and correctly identified the circle, square, and triangle that were placed on the floor. She could name the circle, square, and triangle, and could identify the small geometrical shapes on the table. She was able to copy a circle, square, and triangle, and could draw a circle, square, and triangle.

Subject #14 showed no improvement in her ability to follow the dots and put the formboard together.

Subject #14 was unable to respond correctly when she was asked to walk a circle, square, and triangle.

It appeared as though Subject #14 showed no improvement in her ability to trace the figures. She did show improvement in her ability to trace the shapes between the pre-test and the second test, although she decreased in her ability to do this between the second test and final test. She learned how to draw the triangle between the pre-test and the second test but was unable to draw the square. She was unable to show improvement in her ability to walk any of the shapes.

## SUBJECT #15

### Background Data

Subject #15, a righthanded male, was born on Feburary 14, 1959, in Greensboro, North Carolina. He lived in a moderate income bracket. He was the youngest of four children. He had one sister. Both his parents completed the eleventh grade but his father was deceased.

He had scored below average on the evaluation of social and personal assets as rated by his classroom teacher.

After his first year at school, his classroom teacher said that Subject #15 had made a great deal of progress in self care skills and showed signs of continual growth. His classroom teacher this year stated that he had made outstanding progress in relating to his playmates and adults. He was becoming more of a leader. He often would begin activities and invite others to join him.

Although the boy was suspected to be mentally retarded, the cause of retardation was not known.

### Summary of Observations

Subject #15 was a very pleasant and cooperative boy all during the study.

In the first lesson, Subject #15 had difficulty maintaining his balance on all the shapes. He was aware that he was supposed to stay on the lines and boards but he could not do it. This problem decreased somewhat during the study but he needed more work in this area.

In the first lesson, he was unable to name the shapes, nor did he respond correctly to the commands of walk forward, backward, sideways, hop and jump.

He was able to bounce the ball, but usually after a half dozen bounces, the ball would go out of control.

He was not able to make any of the shapes with the materials that were available, but after the 8th lesson, he was able to make the square and the triangle.

He began working on the diamond at the 14th lesson because it was felt that he knew the circle, square, and triangle. By the 16th lesson, he was able to identify the diamond although he could not pronounce the word clearly.

In lesson #21, the first lesson with the small geometrical shapes, Subject #15 was able to identify the circles and squares on the table. He was not able to find the triangles.

Because it was felt that he knew the circle, square, triangle, and diamond, work was begun on the rectangle in the 25th lesson.

In the 29th lesson, he was able to walk forward, backward, and sideways. He could also hop and jump although his movements were still limited. He could identify the large figures that were put on the floor. He could name the circle, square, triangle, diamond, and rectangle. He could identify and name the small geometrical objects on the table. These objects included circles, squares, rectangles, and triangles. He was able to make a square, diamond, triangle, and rectangle from the materials provided.

## Test Results

### Formboard

Subject #15 had no difficulty putting the formboard together in the pre-test, second test, and post-test.

Tracing the Geometrical Shapes

Subject #15 was able to trace the circle, square, and triangle with only minor deviations in the pre-test.

In the second test, Subject #15 was unable to remain in contact with the dots on the circle. He had some minor deviations around the square and the triangle.

In the final test, Subject #15 was unable to remain in contact with the dots around the circle, square, or triangle.

Draw One Like It

In the pre-test, second test, and final test, Subject #15 was able to copy a circle, square, and triangle.

Draw a Circle, Square, Triangle, Diamond, and Rectangle

In the pre-test, Subject #15 was able to draw a circle. He was unable to draw a square or a triangle. For the square, he drew a triangle, and for a triangle, he drew a small square. The diamond and rectangle had not yet been introduced.

In the second test, Subject #15 was able to draw a circle, square, triangle, and diamond.

In the final test, Subject #15 was able to draw a circle, triangle, and rectangle. He drew a rectangle when he was asked to draw a square, and he could not draw a diamond.

Taking the highest score by each rater from each trial, Subject #15 scored the following scores out of a possible 25 for the circle, square, and triangle.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 15 | 16 | 19 | 50 |
| Square | 3 | 17 | 13 | 33 |
| Triangle | 3 | 20 | 20 | 43 |
| Total | 21 | 53 | 52 | |
| Diamond | | 10 | 3 | 13 |
| Rectangle | | | 19 | 19 |

Taking the total score from each test, Subject #15 scored a total of 21 points out of a possible 75 points in the pre-test. In the second test, he scored a total of 53 points out of a possible 75 points. This was a 32 point gain over the score in the pre-test. In the final test, Subject #15 scored a total of 52 points out of a possible 75 points. This was one point less than the total score in the second test, but was 31 points higher than the pre-test score.

Subject #15 was also able to draw a rectangle at the end of the study. There was some doubt as to his ability to draw a diamond.

Walk a Circle, Square, Triangle, Diamond, and Rectangle

Subject #15 was able to walk a circle in a counterclockwise direction in the pre-test. He repeated this same movement for the square and triangle.

In the second test, Subject #15 walked a circle in a counterclockwise direction. He walked a square but he rounded the corners. He was able to walk a triangle although he wandered slightly. The triangle had rounded corners. He was not able to walk a diamond.

Subject #15, in the final test, was able to walk a circle, square, triangle, diamond, and rectangle. He moved around these figures in a counterclockwise direction.

Psychological Reports

On August 25, 1966, Subject #15 was given the Revised Stanford-Binet, Form L-M (1960). At this time, his chronological age was 7 years and 6 months and his mental age could not be obtained. His I.Q. score was estimated between 30 and 35.

On May 16, 1968, two days after the conclusion of this study, Subject #15 was again given the Revised Stanford-Binet, Form L-M (1960). At this time, his chronological age was 9 years and 3 months and his mental age was 3 years and 10 months. His I.Q. score was 40. This is a 5 to 10 point gain over his previous I.Q. score.

Evaluation of Progress

Subject #15 improved in his ability to respond correctly to the word commands of walk forward, backward, sideways, hop and jump. He could identify and name the circle, square, triangle, diamond, and rectangle although he did have trouble pronouncing diamond and rectangle, and could make from the material available, the square, triangle, diamond, and rectangle. He could identify by name the small geometrical shapes and maintain balance, although insecure, around the circle, square, triangle, diamond, and rectangle; draw a square, triangle, diamond, and rectangle; and walk a square, triangle, diamond, and rectangle.

Subject #15 remained the same in his ability to put a formboard together, copy a circle, square, and triangle, draw a circle, and walk a circle.

Subject #15 decreased in his ability to trace the circle, square, and triangle.

He learned to draw a square and triangle by the second test. He was able to draw a rectangle by the post-test. He learned to walk a square and a triangle by the second test and learned to walk a diamond and a rectangle by the post-test.

## SUBJECT #16

### Background Data

Subject #16 was born on July 16, 1955, in Greensboro, North Carolina. She was one of five children. Her mother completed the eleventh grade and was a housewife. Her father completed the tenth grade. The parents were separated.

The child was righthanded. She was suspected of being mentally retarded, but the cause of retardation was not known.

This child had congenital cataracts in both eyes and experienced some decreased vision.

Little progress was noted after one year in a public school system. The evaluation of social and personal assets was below average, as rated by her classroom teacher, although there was some improvement in co-operation and dependability. She seemed to be an emotionally and socially well adjusted child. She showed signs of growth in self confidence, and was competent in self care skills.

### Summary of Observations

When Subject #16 first came into her lesson she was unable to identify the geometrical shapes. She was not able to perform correctly to the verbal cues of walk forward, walk backward, walk sideways, hop and jump. She could not identify her various body parts. This discrimi-

nation of body parts was not continued after lesson #4. Through practice, she was able to make the shapes that were asked of her. This skill was acquired for the square and the triangle during the first nine lessons although there were times after this in which she could not remember.

She took her time completing the movement patterns and usually was very successful although she lost her balance more frequently on the square than on the circle and triangle.

The diamond was added in lesson #13 because it was felt that she knew the circle, square, and triangle. In lesson #14 she could identify the diamond and in lesson #18 she was able to make a diamond with the available material.

In lesson #19, she was unable to recognize any of the small geometrical shapes. These shapes included the circle, square, and triangle. In lesson #20, she was able to identify a small circle, square, and triangle. After this lesson, other objects were added and she was able to recognize these also.

Because it was felt that Subject #16 knew the circle, square, triangle, and diamond, the rectangle was introduced in lesson #23. In lesson #24, she needed help in identifying the rectangular shapes around the room. By lesson #28, with some encouragement, she was able to move about the room and identify some of the circular objects such as the doorknob and the buttons on a coat.

In lesson #29, she was able to respond correctly to walk forward, walk backward, sideways, hop and jump. At this time it was also felt that she could identify the circle, square, triangle, and diamond. There was some doubt as to her ability to recognize the rectangle.

## Test Results

### Formboard

Subject #16 had no difficulty putting the formboard together in the pre-test, second test, and post-test.

### Tracing the Geometrical Shapes

Subject #16 was able to trace the geometrical shapes in the pre-test, second test, and final test.

### Draw One Like It

In the pre-test, second test, and final test, Subject #16 was able to copy a circle, square, and triangle.

### Draw a Circle, Square, Triangle, Diamond, and Rectangle

In the pre-test, Subject #16 was able to draw a circle. She was unable to draw a square or a triangle. When she was asked to draw a square, she drew a triangle and when she was asked to draw a triangle she drew a circle.

In the second test, Subject #16 was able to draw a circle, square, and triangle. She was unable to draw a diamond.

Subject #16 was able to draw a circle and a triangle in the post-test. Her square was drawn like a rectangle and her rectangle was drawn like a square. She also drew the diamond in the shape of a square.

Taking the highest score by each rater from each trial, Subject #16 scored the following scores out of a possible 25 points.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 15 | 17 | 21 | 53 |
| Square | 3 | 17 | 13 | 33 |
| Triangle | 3 | 20 | 20 | 43 |
| Total | 21 | 54 | 54 | |
| Diamond | | 0 | 5 | 5 |
| Rectangle | | | 11 | 11 |

Taking the total score from each test, Subject #16 scored a total of 21 points out of a possible 75 points in the pre-test. In the second test, she scored a total of 54 points out of a possible 75 points. This was 33 points over the pre-test score. She also scored 54 points in the final test.

There was some doubt as to whether Subject #16 could draw a diamond and a rectangle at the end of this study.

Walk a Circle, Square, Triangle, Diamond, and Rectangle

The pre-test indicated that Subject #16 was unable to walk a circle, square, or triangle without any cues.

In the second test, Subject #16 was able to walk a circle in a counterclockwise direction. She also walked a square and a triangle in a counterclockwise direction. She was not successful in walking a diamond, but walked a triangle for this.

During the final test, Subject #16 was able to walk a circle, triangle, diamond, and a rectangle. She walked a rectangle for a square. She moved around these figures in a counterclockwise direction.

Psychological Reports

Subject #16 was given the Revised Stanford-Binet, Form L-M (1960), on September 13, 1962. At this time her chronological age was 7 years

and 2 months and her mental age was 3 years and 1 month. Her I.Q. score was 39.

On November 28, 1967, Subject #16 was again given the same test. At this time her chronological age was 12 years and 4 months and her mental age was 4 years and 10 months. Her I.Q. score was 45. This was a 6 point gain over her previous score.

On May 16, 1968, Subject #16 was again tested with the above test. At this time her chronological age was 12 years and 10 months and her mental age was 5 years and 2 months. Her I.Q. score was 46. This was a one point gain over the test score in 1967 and a 7 point gain over the test score given in 1962.

Evaluation of Progress

Subject #16 improved in her ability to respond correctly to word commands of walk forward, backward, sideways, hop and jump, to identify and name the circle, square, triangle, diamond, and rectangle, and to make from the material available the square, triangle, diamond, and rectangle. She could identify by name the small geometrical shapes of circle, square, and triangle, and walk around the circle, square, triangle, diamond, and rectangle. She was able to draw a square, triangle, diamond, and rectangle and could walk a circle, square, triangle, diamond, and rectangle.

Subject #16 showed no improvement in her ability to put the form-board together, to trace the circle, square, and triangle, to copy a circle, square, and triangle, and to draw a circle.

Subject #16 learned to draw the square and triangle between the pre-test and second test. She learned to walk the square and triangle

between the pre-test and she learned to walk the diamond and rectangle between the second and the final test.

SUBJECT #17

Background Data

Subject #17 was born on October 9, 1959, in Greensboro, North Carolina.

Her mother and father completed a high school education. Her father was a laborer. She had one sister who was older than she.

She was suspected of being mentally retarded, but the cause of retardation was not known.

She scored below average on the evaluation of social and personal assets as rated by her classroom teacher.

She completed grade one in a public school but at the end of the year her teacher said that her intelligence handicapped her.

Her special education teacher noted that Subject #17 had shown good progress in relating to her classmates.

Summary of Observations

Subject #17 could not walk forward or backward to the verbal cues in her first lesson. She did not know the names of the circle, square, or triangle. She was able to differentiate between hop and jump although at times she did confuse these movements. She did not know how to play tag but she picked this up very quickly. She was able to bounce the ball twice before losing control of it.

She was not able to make any of the figures from the material provided during the first nine lessons but in lesson #10 she was able

to make from the boards the square and triangle. She could also correctly identify the circle, square, and triangle although she could not always correctly identify them in the following lessons. By lesson #19, she was able to respond correctly to the commands of walk forward, backward, and sideways.

She did not have any trouble maintaining her balance while walking the three shapes because she kept her movements small and under control.

When the small geometrical shapes including the circle, square, and triangle were placed on the table in the 23rd lesson, she was unable to identify them correctly. She was able to identify the small circular objects by the 25th lesson, although she sometimes forgot this shape. In lesson #26, she was able to pick the small triangles out on the table although, in lesson #29, she was unable to identify the small circle, square, or triangle. In the 29th lesson, she was able to respond correctly to the commands of walk forward, walk backward, hop and jump. She also knew the name of the circle and the triangle but had trouble remembering the name of the square.

## Test Results

### Formboard

Subject #17 had no difficulty putting the formboard together in the pre-test, second test, or post-test.

### Tracing the Geometrical Shapes

In the pre-test, Subject #17 was unable to remain in contact with the dots around the circle, square, or triangle.

In the second test, she was unable to remain on the dots while

tracing the circle. She was able to remain on the dots while tracing the square in the second test except when she rounded the corners. She was unable to follow the dots around the triangle in the second test.

In the final test, she was unable to remain in contact with the dots around the circle. She was able to trace the square and the triangle in the final test.

Draw One Like It

She was unable to copy a square, circle, or triangle in the pre-test. In the second test, she was able to copy a circle but she was unable to copy a square or a triangle. In the final test, she was able to copy a circle, square, and triangle.

Draw a Circle, Square, and Triangle

Subject #17 was unable to draw a circle, square, or triangle in the pre-test and second test. In the final test, she was able to draw a circle, square, and triangle.

Taking the highest score by each rater from each trial, Subject #17 scored the following scores out of a possible 25 points.

| | Pre-Test | Second Test | Final Test | Total |
|---|---|---|---|---|
| Circle | 2 | 11 | 20 | 33 |
| Square | 8 | 8 | 19 | 35 |
| Triangle | 12 | 3 | 21 | 36 |
| Total | 22 | 22 | 60 | |

Taking the total score for each test, Subject #17 scored a total of 22 points out of a possible 75 points in the pre-test. In the final test, she scored a total of 60 points out of a possible 75 points. This was a 38 point gain over the pre-test score.

Walk a Circle, Square, and Triangle

The pre-test indicated that Subject #17 was unable to walk a circle, square, or triangle. She did walk a concave line for the circle and did a side step from left to right for the square and triangle.

In the second test, she was unable to walk a circle although she did pick up her leg and swing it around in a circle. She repeated this same motion for the square. She stood still when she was asked to make a triangle.

In the post-test, she walked a circle in a clockwise direction. She also walked a complete square and moved in a clockwise direction. She was able to walk a triangle and again, moved in a clockwise direction. She did not show any hesitation in any of her movements.

Psychological Reports

On January 12, 1966, Subject #17 was given the Revised Stanford-Binet, Form L-M (1960). At this time her chronological age was 6 years and 3 months and her mental age was 2 years and 9 months. Her I.Q. score was 38.

On May 16, 1968, two days after the conclusion of this study, Subject #17 was again given the Revised Stanford-Binet, Form L-M (1960). At this time her chronological age was 8 years and 7 months and her mental age was 4 years and 4 months. Her I.Q. score was 48. This was a 10 point gain over her previous I.Q. score.

## Evaluation of Progress

Subject #17 improved in her ability to respond correctly to the word commands of walk forward, walk backward, hop and jump, to make a

square and a triangle from the materials available, and to identify correctly the circle, square, and triangle that were placed on the floor. She could name the circle and triangle and at times, the square, and was able to identify the small circular figures most of the time. She could maintain her balance while walking around the geometrical shapes and was able to trace the geometrical shapes of the square and the triangle. She was able to copy a square, circle, and triangle and draw a circle, square, and triangle. She could also walk a circle, square, and triangle.

Subject #17 was unable to respond correctly when she was asked to identify the small geometrical shapes of a square and triangle, follow the dots around the circle, and walk sideways.

Subject #17 remained the same in her ability to put the formboard together.

It appeared as though Subject #17 improved in her ability to trace and copy between the pre-test and post-test. She also showed improvement between the pre-test and post-test in her ability to draw and walk a circle, square, and triangle.

# CHAPTER VI

## DISCUSSION OF FINDINGS

### Formboard

In Treatment #1, all the subjects were able to put the formboard together at the conclusion of this study. Only one child had difficulty with this test during the pre-test and second test. At the completion of the study, all the subjects in Treatment #2 had no difficulty in putting the formboard together. They also had been able to do this at the beginning of the study. There appeared to be no difference between the two groups in their ability to put the formboard together.

Putting the formboard together necessitated an understanding of form perception. Since both groups completed Test #1, they were able to discriminate between the styrofoam cutouts and the plywood board and thus showed an understanding of form perception.

### Tracing the Geometrical Shapes

All of the subjects in Treatment #1 were able to trace a circle in the post-test although only two of these subjects could trace the circle correctly in the pre-test. Six of the eight subjects were able to trace the circle correctly in the second test.

Only three of the nine subjects were able to trace a square in the post-test and only two subjects were able to trace it correctly in the pre-test. Four subjects were able to trace the triangle correctly in the pre-test and second test but only three subjects were able to

TABLE I

FORMBOARD

| | PRE-TESTS | | SECOND TESTS | | POST-TESTS | |
|---|---|---|---|---|---|---|
| | Could put a form-board together | Could not put a formboard together | Could put a form-board together | Could not put a formboard together | Could put a form-board together | Could not put a formboard together |
| Treatment #1 | #1 | | #1 | | #1 | |
| | #2 | | #2 | | #2 | |
| | #3 | | #3 | | #3 | |
| | #4 | | #4 | | #4 | |
| | #5 | | #5 | | #5 | |
| | #6 | | #6 | | #6 | |
| | #7 | | #7 | | #7 | |
| | | #8 | | #8 | #8 | |
| | #9 | | #9 | | #9 | |
| Treatment #2 | #10 | | #10 | | #10 | |
| | #11 | | #11 | | #11 | |
| | #12 | | #12 | | #12 | |
| | #13 | | #13 | | #13 | |
| | #14 | | #14 | | #14 | |
| | #15 | | #15 | | #15 | |
| | #16 | | #16 | | #16 | |
| | #17 | | #17 | | #17 | |

trace it correctly in the final test.

From the above information, it was noted that the subjects in Treatment #1 appeared to learn to trace the circle more easily and more quickly than the square and triangle. It appeared that this skill was acquired for most of these children between the pre-test and the second test. In Treatment #1, the children's ability to trace a square improved between the pre-test and second test but then decreased between the second test and final test. There was no improvement noted in the children's ability to trace a triangle during the twelve week period. There was a decline in the number of children able to complete this skill in the post-test.

In Treatment #2, four of the eight children were able to trace the circle in the pre-test, second test, and post-test. Six of the eight subjects were able to trace the square in the second and final tests, whereas, only three of the subjects were able to complete this skill in the pre-test. Four of the children were able to trace the triangle in the pre-test and second test, and six subjects were able to trace it in the final test.

There appeared to be no improvement in ability to trace a circle between the pre-test and final test for the children in Treatment #2. Learning to trace the square seemed to have occurred between the pre-test and the second test and learning to trace the triangle seemed to have occurred between the pre-test and the final test. It seemed as though the square and triangle were the figures most easily traced by the children in Treatment #2.

Between the two groups, it appeared as though the children in

Treatment #1 learned to trace the circle faster than the children in Treatment #2, whereas, more of the children in Treatment #2 were able to trace the square and triangle than could the children in Treatment #1.

It appeared as though the children in Treatment #1 were following the concept set by Piaget and Inhelder (25) and Radler and Kephart (26). These men stated that the circle would be the easiest figure for the children to work with because of the circle's continuous flowing line.

Due to the practice that the children in Treatment #1 acquired during the study, improvement was expected. It was felt that more of the children in Treatment #1 should have been able to trace the square and triangle due to the amount of time that had been spent working on this skill.

The children in Treatment #2 were not able to show any improvement in their ability to trace a circle although there was an improvement shown in their ability to trace a square and triangle. The square and triangle, as noted by Piaget and Inhelder (25), and Radler and Kephart (26) were two of the hardest figures for the children to work with because of the constant changing of direction needed in order to complete the figures. Also, the children in Treatment #2 had very little practice tracing the geometrical shapes. But even the small amount of practice that they had in their lessons, combined with large motor movement around the same shapes, seemed to have aided them in their ability to trace the square and triangle although it did not seem to help them in their ability to trace the circle.

Because the skill of tracing any figures required the mastery of visual cues presented, it appeared that the children in Treatment #2

TABLE II

TRACING THE GEOMETRICAL SHAPES

| | PRE-TESTS | | | | | | SECOND TESTS | | | | | | POST-TESTS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Could not trace a | | | Could trace a | | | Could not trace a | | | Could trace a | | | Could not trace a | | | Could trace a | | |
| | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle |
| | #1 | #1 | #1 | | | | | | | #1 | | | | | | #1 | | |
| | | | | #2 | #2 | #2 | | | | #2 | #2 | #2 | | | | #2 | #2 | #2 |
| | | | | #3 | | #3 | | | | #3 | #3 | | | | | #3 | | |
| Treatment | | | | | | #4 | | | | | #4 | #4 | | | | #4 | | |
| #1 | #5 | #5 | #5 | | | | | | | #5 | | | | | | #5 | | |
| | #6 | #6 | #6 | | | | | | | #6 | #6 | #6 | | | | #6 | #6 | #6 |
| | #7 | #7 | #7 | | | | #7 | #7 | #7 | | | | | | | #7 | | |
| | #8 | #8 | #8 | | | | #8 | #8 | #8 | | | | | | | #8 | | |
| | | | | | #9 | #9 | | | | #9 | #9 | #9 | | | | #9 | #9 | #9 |
| | #10 | #10 | #10 | | | | | | | #10 | #10 | #10 | | | | | #10 | #10 |
| | | | | #11 | | #11 | | | | #11 | #11 | #11 | | | | #11 | #11 | #11 |
| | | | | #12 | #12 | #12 | | | | | #12 | | | | | #12 | #12 | #12 |
| Treatment | #13 | #13 | #13 | | | | #13 | #13 | #13 | | | | | | | #13 | #13 | #13 |
| #2 | #14 | #14 | #14 | | | | #14 | #14 | #14 | | | | #14 | #14 | #14 | | | |
| | | | | #15 | #15 | #15 | | | | | #15 | #15 | #15 | #15 | #15 | | | |
| | | | | #16 | #16 | #16 | | | | #16 | #16 | #16 | | | | #16 | #16 | #16 |
| | #17 | #17 | #17 | | | | | | | | #17 | | | | | | #17 | #17 |

were better able to follow the visual cues given in Test #2 and could produce more precise movements around the three geometrical shapes than could the children in Treatment #1. Therefore, it seemed that the program that included the large motor movements around the geometrical shapes offered in Treatment #2 aided the children in Treatment #2 to follow the visual cues presented.

## Draw One Like It

All of the subjects in Treatment #1 were able to copy a circle in the post-test although only three of the subjects were able to copy it correctly in the pre-test. Eight of the nine children were able to copy a circle in the second test. Two of the children were able to copy a square in the pre-test but only four children were able to copy the square in the second test and final test. Two of the children were able to trace the triangle in the pre-test, whereas, four of them were able to trace it in the second test. Only three children could trace it in the final test.

It appeared as though the circle was the easiest figure for the children in Treatment #1 to copy and it appeared as though this skill emerged between the pre-test and the second test. An increase in the number of children able to trace a square between the pre-test and the second test indicated that some learning took place between these two tests. There did not seem to be any increase in the number of children able to copy the square between the second test and final test. The second test showed a slight increase in the number of children able to draw a triangle from the number in the pre-test but this number again decreased in the post-test.

Three of the subjects in Treatment #2 were unable to copy a circle in the pre-test although all of the children were able to complete this skill in the second test and final test. Five of the subjects were able to copy a square in the pre-test and seven of the subjects were able to copy the square in the second test and final test. Three of the children were able to copy the triangle in the pre-test and five were able to trace it in the second test. Six children were able to copy the triangle in the final test.

It appeared as though five of the eight subjects were familiar with copying a circle in the pre-test although all of the subjects were able to learn this skill by the second test. For the three subjects who did not know how to trace a square in the pre-test, two of the children learned this skill between the pre-test and the second test. It appeared as though most of the children learned to copy a triangle between the pre-test and the final test.

In comparing the two groups, it appeared as though both groups, except one subject in Treatment #1, were able to copy a circle in the second test. Therefore, there appeared to be no significant improvement between the groups in their ability to copy a circle. Again, as noted by Piaget and Inhelder (25) and Radler and Kephart (26), the circle would be the easiest figure for the children to work with because of the unbroken line.

More subjects in Treatment #2 than in Treatment #1, not able to trace a square in the pre-test, were able to perform this skill in the second and final test. This was also true for the triangle. Therefore, more of the children in Treatment #2 learned to copy a square and a

TABLE III

DRAW ONE LIKE IT

| | PRE-TESTS | | | | | | SECOND TESTS | | | | | | POST-TESTS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Could not copy a | | | Could copy a | | | Could not copy a | | | Could copy a | | | Could not copy a | | | Could copy a | | |
| | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle |
| | #1 | #1 | #1 | | | | #1 | #1 | #1 | | | | | | | #1 | | |
| | | | | #2 | #2 | #2 | | | | #2 | #2 | #2 | | | | #2 | #2 | #2 |
| | #3 | #3 | #3 | | | | | | | #3 | #3 | #3 | | | | #3 | #3 | #3 |
| Treatment | #4 | #4 | #4 | | | | | | | #4 | #4 | | | | | | #4 | |
| #1 | #5 | #5 | #5 | | | | | | | #5 | | | | | | #5 | | |
| | | | | #6 | #6 | #6 | | | | #6 | | #6 | | | | #6 | #6 | #6 |
| | #7 | #7 | #7 | | | | | | | #7 | | | | | | #7 | | |
| | #8 | #8 | #8 | | | | | | | #8 | | | | | | #8 | | |
| | | | | #9 | | | | | | #9 | #9 | #9 | | | | #9 | | |
| | | | | #10 | #10 | | | | | #10 | #10 | | | | | #10 | #10 | |
| | | | | #11 | #11 | | | | | #11 | #11 | #11 | | | | #11 | #11 | #11 |
| Treatment | | | | #12 | #12 | #12 | | | | #12 | #12 | #12 | | | | #12 | #12 | #12 |
| #2 | #13 | #13 | #13 | | | | | | | #13 | #13 | | | | | #13 | #13 | #13 |
| | #14 | #14 | #14 | | | | | | | #14 | #14 | #14 | | | | #14 | | |
| | | | | #15 | #15 | #15 | | | | #15 | #15 | #15 | | | | #15 | #15 | #15 |
| | | | | #16 | #16 | #16 | | | | #16 | #16 | #16 | | | | #16 | #16 | #16 |
| | #17 | #17 | #17 | | | | | | | #17 | | | | | | #17 | #17 | #17 |

triangle than the number of children in Treatment #2.

No outside practice for either group had been initated during this study, although the subjects in Treatment #1 had seen these same figures on the chalkboard and on construction paper during the study and they had become familiar with the limitations of these figures. The children in Treatment #2 had not seen a circle, square, or triangle drawn on paper in their lessons during the study.

Because the square and triangle are more difficult for the children to work with (25, 26) and more of the subjects in Treatment #2 were able to copy these figures at the conclusion of this study, it seemed as though the whole body movements around the geometrical shapes initiated in Treatment #2, appeared to have aided the children in Treatment #2 to copy these shapes.

It appeared as though the circle was the easiest figure for the children in Treatment #2 to copy. The square seemed to be next to the circle because most of the children in Treatment #2 were able to copy the square by the second test. The triangle appeared to take the longest for the children in Treatment #2 to learn and this was again noted by Piaget and Inhelder (25) and Radler and Kephart (26) that the triangle, with the diagonal lines would present more problems to children than the circle or the square.

In order to copy any figure, a mental image of that figure must be made by the subject and used as a guideline as the figure is copied. The children were able to constantly refer to the picture given and therefore could refresh their mental image. Since more of the children in Treatment #2 were able to copy the figures presented, it seemed that

the program in Treatment #2 better facilitated the processing of the mental images needed to reproduce the circle, square, and triangle.

## Draw a Circle, Square, and Triangle

Four of the nine subjects in Treatment #1 were unable to draw a circle in the pre-test. Seven of the nine subjects were able to draw it in the second test and post-test. Three of the subjects were able to draw the square in the pre-test and post-test but only two of the subjects were able to draw it in the second test. Of the nine children in Treatment #1, three of them were able to draw a triangle in the pre-test. Four subjects were able to draw it in the second and final test.

It appeared as though five of the subjects in Treatment #1 were familiar with drawing circles prior to the pre-test. Two of the four subjects, who were unable to draw a circle in the beginning of this study, were able to complete this task in the second test. The other two students did not learn to draw a circle within the twelve week period.

It also appeared that three of the subjects in Treatment #1 were familiar with drawing a square prior to this study although only one of these three children could repeat this skill in the last two tests. One child learned this skill between the pre-test and the second test and was able to repeat it again in the final test. Another child learned this skill between the pre-test and the post-test.

Again, three of the subjects in Treatment #1 were able to draw a triangle in the pre-test although only two of these subjects were able to repeat this skill in the second test and final test. One

subject learned this skill by the second test and was able to repeat it in the final test. Two more of the subjects were able to draw the triangle in the final test. Another subject was able to perform this skill in the second test but could not repeat it in the final test.

Five of the children in Treatment #2 were able to draw a circle in the pre-test. Two of the three children, unable to draw a circle in the pre-test, learned this skill and were able to draw a circle in the second test and post-test. The one subject who could not draw a circle in the pre-test or second test was able to perform this skill in the final test.

On the eight children in Treatment #2, two of the children were able to draw a square in the pre-test. Five of the eight children were able to perform this skill in the second test and all but one produced a square in the final test.

None of the children in Treatment #2 were able to draw a triangle in the pre-test although five of the eight subjects performed this skill in the second test and seven of the eight subjects were able to draw a triangle in the post-test.

It appeared as though five of the eight subjects in Treatment #2 were familiar with drawing a circle in the pre-test. Of the three children who did not know this skill, two of them acquired it between the pre-test and the second test and the third subject learned this skill between the pre-test and the post-test. Of the seven subjects able to draw a square in the final test, two of them appeared to have learned this skill prior to the study. More of the children seemed to have learned this task between the pre-test and the second test. Five

of the seven subjects, in Treatment #2, who knew how to draw a triangle at the conclusion of this study, were able to perform this skill in the second test. None of the children in Treatment #2 had been able to perform this skill in the pre-test. It appeared as though the learning of this particular skill was acquired for most of the children in Treatment #2 between the pre-test and the second test.

When the two groups were compared, seven of the nine students in Treatment #1 were able to draw a circle and all eight subjects in Treatment #2 were able to perform this skill. Since five of the subjects in Treatment #1 seemed to know how to draw a circle prior to the pre-test, only two of the children in Treatment #1 learned how to draw a circle in this study. Out of the eight subjects in Treatment #2, five of the children were able to draw a circle in the pre-test but the other three children acquired this skill by the post-test.

It appeared as though only two of the nine subjects in Treatment #1 learned to draw a square between the pre-test and post-test because one of the subjects was able to perform this skill in every test and, therefore, it was noted that he had learned to perform the skill prior to this study. Two of the eight subjects in Treatment #2 seemed to have acquired this skill of drawing a square prior to this study, whereas five of the eight subjects in Treatment #2, who were unable to perform this task in the pre-test, were able to perform it in the post-test.

Two of the nine subjects in Treatment #1 were able to draw a triangle in the three tests. It was noted that these two subjects had learned this skill prior to the study. One subject was able to perform this skill in the second test but was not able to retain this knowledge

in the post-test. Only two subjects in Treatment #1, unable to perform this skill in the pre-test, were able to complete this task in the final test. Seven of the eight children in Treatment #2, unable to draw a triangle in the pre-test, were able to perform this skill in the post-test.

At no time during this study were any of the children asked to draw a circle, square or triangle without visual cues. Therefore, neither of the groups had any practice in this skill.

In comparing the above information between the two groups, it became apparent that more children in Treatment #2 learned to draw a circle, square, and triangle in this study than the number of children in Treatment #1. Therefore, it appeared that the large motor movement skills that were employed in Treatment #2 may have helped to facilitate the learning of this skill.

Drawing a geometrical shape from memory required a strong mental image of that shape. These mental images acted as a base for the children to refer to so that they could begin the tasks that were required of them. If the children had not acquired a mental image of the figure that they were to draw, then they would not have been able to complete the task. The children needed a reference point on the piece of paper so that they would be able to complete the task that had been asked of them. In order to have established a reference point, or a place to begin and end, the child must have set up a mental image for himself. This process of drawing a figure without visual cues required a mastery of the perceptual field. Thus "reproduction of the circle represents the highest type of performance where all of the control of

TABLE IV

DRAW A CIRCLE, SQUARE, AND TRIANGLE

| | PRE-TESTS | | | | | | SECOND TESTS | | | | | | POST-TESTS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Could not draw a | | | Could draw a | | | Could not draw a | | | Could draw a | | | Could not draw a | | | Could draw a | | |
| | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle |
| | #1 | #1 | #1 | | | | | | | #1 | | | #1 | #1 | #1 | | | |
| | | | | #2 | #2 | #2 | | | | #2 | #2 | #2 | | | | #2 | #2 | #2 |
| | | | | #3 | | | | | | #3 | #3 | #3 | | | | #3 | #3 | #3 |
| Treatment | | | | #4 | | | | | | #4 | | | | | | #4 | #4 | |
| #1 | #5 | #5 | #5 | | | | | | | #5 | | #5 | | | | #5 | | |
| | | | | #6 | #6 | #6 | | | | #6 | | | | | | #6 | | |
| | #7 | #7 | #7 | | | | #7 | #7 | #7 | | | | | | | #7 | | #7 |
| | #8 | #8 | #8 | | | | #8 | #8 | #8 | | | | #8 | #8 | #8 | | | |
| | | | | #9 | #9 | #9 | | | | #9 | | #9 | | | | #9 | | #9 |
| | | | | #10 | #10 | | | | | #10 | #10 | | | | | #10 | #10 | #10 |
| | | | | | #11 | | | | | #11 | #11 | #11 | | | | #11 | #11 | #11 |
| Treatment | | | | #12 | | | | | | #12 | | #12 | | | | #12 | #12 | #12 |
| #2 | #13 | #13 | #13 | | | | | | | | #13 | | | | | | #13 | |
| | | | | #14 | | | | | | #14 | | #14 | | | | #14 | | #14 |
| | | | | #15 | | | | | | #15 | #15 | #15 | | | | #15 | #15 | #15 |
| | | | | #16 | | | | | | #16 | #16 | #16 | | | | #16 | #16 | #16 |
| | #17 | #17 | #17 | | | | #17 | #17 | #17 | | | | | | | #17 | #17 | #17 |

TABLE V

SPEARMAN'S RANK DIFFERENCE CORRELATION BETWEEN RATERS

| Raters | Pre-tests | Second tests | Post-tests |
|---|---|---|---|
| 1 and 2 | .59 | .07 | .87 |
| 1 and 3 | .96 | .92 | .96 |
| 1 and 4 | .93 | .72 | .98 |
| 1 and 5 | .90 | .85 | .95 |
| 2 and 3 | .58 | .20 | .86 |
| 2 and 4 | .54 | .36 | .91 |
| 2 and 5 | .50 | .39 | .90 |
| 3 and 4 | .94 | .84 | .92 |
| 3 and 5 | .88 | .89 | .94 |
| 4 and 5 | .85 | .91 | .94 |

the activity has become cortical and intellectual" (19:192). More of the subjects in Treatment #2 were able to draw the required geometrical shapes than the subjects in Treatment #1, therefore, the program that initiated the large motor movements around the geometrical shapes aided the subjects in Treatment #2 to learn to draw these shapes easier than the subjects in Treatment #1.

## Walk A Circle, Square, and Triangle

Two of the nine children in Treatment #1 were able to walk a circle to the verbal cues given in the pre-test. None of the children in Treatment #1 were able to walk a square or a triangle in the pre-test. In the second test, three of the nine children were able to walk a circle, but no one was able to walk a square. Only one child in Treatment #1 could walk a triangle in the post-test. Six of the children in Treatment #1 were unable to respond correctly to any of the verbal cues. Three of the subjects in Treatment #1 were unable to respond correctly to the verbal cues in the final test. Five children responded correctly when they were asked to walk a circle and only one child was able to walk a square in the post-test. Three of the children in Treatment #1 were able to walk a triangle.

It appeared as though the circle was the easiest figure for the children in Treatment #1 to respond to, although the learning of this skill seemed to have emerged between the pre-test and the post-test. The square seemed to be the hardest figure for the children in Treatment #1 to learn to walk and only one subject was able to learn this skill by the conclusion of this study. Between the pre-test and post-

test, three of the children learned to respond correctly to the verbal cue to talk a triangle.

In Treatment #2, two of the eight subjects were able to walk a circle in the pre-test. No one was able to respond correctly when asked to walk a square or a triangle. In the second test, three of the subjects were unable to respond to any of the verbal cues. Four of the subjects in Treatment #2 were able to walk a circle and a square in the second test. One of the subjects, who could walk a circle in the pre-test, was only able to respond correctly to the verbal cue to walk a square in the second test. Three of the children were able to walk a triangle in the second test. In the final test, two subjects were unable to respond correctly to any of the verbal cues. One of these subjects had responded correctly to the verbal cue to walk the circle in the pre-test and to walk a square in the second test, but she was unable to retain these skills in the post-test. Six of the eight subjects were able to respond correctly to the verbal cues to walk a circle, square, and triangle in the post-test.

The same number of children in Treatment #2 were able to respond correctly to walk a circle and a square in the second test, but it appeared as though the square was the easiest figure for the children in Treatment #2 to learn. This was indicated because one of the subjects, who was able to draw a circle in the pre-test, was able to repeat this skill in the second test. Therefore, only three subjects learned to walk a circle between the pre-test and second test, whereas four of the subjects were able to walk a square in the second test. In the final test, all of the children except two were able to respond

correctly to the verbal cues to walk a circle, square, and triangle.

In comparing the two treatments, it was noted that two of the subjects from each group were able to walk a circle in the pre-test. Five of the nine subjects in Treatment #1 were able to perform this skill in the post-test, whereas six of the eight subjects in Treatment #2 were able to respond correctly to the verbal cue to walk a circle.

None of the children in either treatment were able to respond correctly to walk a square in the pre-test and only one subject in Treatment #1 was able to respond correctly in the final test. Six of the eight subjects in Treatment #2 were able to respond correctly when they were asked to walk a square. One subject in Treatment #2, unable to respond correctly to the verbal cue in the final test, had been able to perform this skill in the second test.

None of the children in either treatment responded correctly to the verbal cue of walk a triangle in the pre-test. Three of the subjects in Treatment #1 performed this skill in the final test, whereas six of the eight subjects in Treatment #2 were able to perform this skill in the post-test.

None of the children in either treatment had any practice walking these shapes without visual cues during the study.

It therefore appeared that more of the subjects in Treatment #2 were able to respond correctly to the verbal cues provided in this test than the number of subjects in Treatment #1.

In order for a child to walk a given geometrical shape, the child must form a mental image of the figure he is to walk. He then must

organize the mental image that he formed into the correct spatial relationship that the problem requires. He then relates this required effort to his total body movements.

Because more of the subjects in Treatment #2 were able to walk a circle, square, and triangle without visual cues, it appeared that total body movements around the geometrical shapes aided the children in Treatment #2 in relating their mental images into the correct spatial relationships utilizing the whole body to represent the learned forms.

TABLE VI

WALK A CIRCLE, SQUARE, AND TRIANGLE

| | PRE-TESTS | | | | | | SECOND TESTS | | | | | | POST-TESTS | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Could not walk a | | | Could walk a | | | Could not walk a | | | Could walk a | | | Could not walk a | | | Could walk a | | |
| | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle | Circle | Square | Triangle |
| Treatment #1 | #1 | #1 | #1 | #2 | | | #1 | #1 | #1 | #2 | | | #1 | #1 | #1 | #2 | #2 | |
| | #3 | #3 | #3 | #4 | | | #3 | #3 | #3 | #4 | | #4 | #3 | #3 | #3 | #4 | | #4 |
| | #5 | #5 | #5 | | | | #5 | #5 | #5 | #6 | | | | | | #5 | | |
| | #6 | #6 | #6 | | | | | | | | | | | | | #6 | | #7 |
| | #7 | #7 | #7 | | | | #7 | #7 | #7 | | | | | | | | | |
| | #8 | #8 | #8 | | | | #8 | #8 | #8 | | | | #8 | #8 | #8 | | | |
| | #9 | #9 | #9 | | | | #9 | #9 | #9 | | | | | | | #9 | | #9 |
| Treatment #2 | #10 | #10 | #10 | | | | #10 | #10 | #10 | | | | #10 | #10 | #10 | | | |
| | #11 | #11 | #11 | | | | | | | #11 | #11 | #11 | | | | #11 | #11 | #11 |
| | #12 | #12 | #12 | | | | #12 | #12 | #12 | | | | | | | #12 | #12 | #12 |
| | #13 | #13 | #13 | | | | | | | #13 | | | | | | #13 | #13 | #13 |
| | | | | #14 | | | | | | | #14 | | #14 | #14 | #14 | | | |
| | | | | #15 | | | | | | #15 | #15 | #15 | | | | #15 | #15 | #15 |
| | #16 | #16 | #16 | | | | | | | #16 | #16 | #16 | | | | #16 | #16 | #16 |
| | #17 | #17 | #17 | | | | #17 | #17 | #17 | | | | | | | #17 | #17 | #17 |

# CHAPTER VII

## SUMMARY AND CONCLUSIONS

This study was an attempt to investigate the effect of large motor movements around geometrical shapes on the ability of trainable mentally retarded children to draw these same geometrical shapes.

### Selection of the Subjects

The seventeen students selected for the study were members of the two trainable classes at the Charles C. Moore Elementary School in Greensboro, North Carolina. The children selected were between the ages of seven and thirteen years old and had an I.Q. score between 20 and 55.

### Background Data

Background information was obtained on each child that included the chronological age, mental age, if known, the cause of retardation, if known, the number of children in the family, and economic status of the family.

### Class Organization

A visitation schedule had been set up a week before the study was to begin so that a positive relationship could be established. At this time, Mrs. Charles Boswell, the teacher of the youngest trainable class, was asked to instruct the Treatment #1 group of children. She was encouraged to use any methods of presentation of the material that

she thought would facilitate the learning of the geometrical shapes by the children in Treatment #1. She was asked not to encourage the children to draw any of the shapes without visual cues or to move around these shapes using total body movements.

## Administration of Tests

Five tests were administered to the subjects. The subjects were tested on their ability to put a formboard together, to trace the circle, square, and triangle, to copy a circle, square, and triangle, to draw a circle, square, and triangle, and to walk a circle, square, and triangle. These same tests were given again after seven weeks and then again at the end of the study. A comparison was made between each trial to determine if there was any difference between the tests. The fourth test, draw a circle, square, and triangle, was subjected to statistical analysis after being rated by five raters. This was done to investigate the possibility of a significant change between the groups during the first, second, and final tests.

The progress of the children in Treatment #1 was noted by Mrs. C. Boswell. This material provided the basis for the case reports for Treatment #1.

In Treatment #2, procedures for each child were recorded in day by day case reports so that individual progress could be interpreted.

## Summary of Results

All of the subjects in both treatments were able to put the formboard together in the final test. There was no significant difference between the groups in their ability to complete test #1.

More of the children in Treatment #2 were able to trace the geometrical shapes in the final test than the number of children in Treatment #1.

More of the children in Treatment #2 were successful in copying a circle, square, and triangle in the final test than the number of children in Treatment #1.

It appeared as though more of the subjects in Treatment #2 were able to draw a circle, square, and triangle in the post-test than the number of children able to do this in Treatment #1.

More of the children in Treatment #2 were able to learn to walk a circle, square, and triangle to the verbal cues than the children who were successful in Treatment #1.

## CONCLUSIONS

It appeared, on the basis of this study, that movement experiences around geometrical shapes, appropriate to the level of the child's ability, might be of value in helping the retarded child perceive these geometrical shapes and, therefore, aid the child in representing these shapes through tracing, copying, and walking.

It was felt by the writer that motivation and the effect of individualized teaching may have also played an active part in this study.

With the results ascertained in this study, the writer would like to recommend that further research be conducted with retarded children in relation to total body movement and learning. A study, such as the one above, with the same teacher for both groups on a one to one basis

every day would eliminate the variable of individualized versus group instruction. If the study were repeated, it might result in a different conclusion.

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# APPENDIX A

## TREATMENT #1

### Lesson Plans

Lesson #1

The subjects were familiarized with the shapes by identifying the shapes with definite colors. A yellow circle, a blue square, and an orange triangle were shown. The ball was also identified as being a circle, the box was identified as being a square, and a housetop was called a triangle.

Lesson #2

The children continued to identify the colored shapes. The cardboard shapes were matched with the shapes shown on the chalkboard.

Lesson #3

The children traced and identified the figures on the chalkboard. They corrected mismatching.

Lesson #4

The children were given a piece of paper with the circles, squares, and triangles drawn on the paper and they had to color all the circles yellow, all the squares blue, and the triangles orange.

Lesson #5

The children traced and identified the figures on the board.

Lesson #6

Reviewed Lesson #5.

Lesson #7

The children used their fingers to trace around the figures that they were holding in their hands and then matched that figure to the same figure on the board.

Lesson #8

The children colored the proper shape the proper color.

Lesson #9

The children identified the different shapes placed randomly on the chalkboard.

Lesson #10

Reviewed Lesson #9.

Lesson #11

The children matched the cardboard shapes in their hands to the correct shape on the chalkboard.

Lesson #12

Each child had a shape in his hand. If they had the same shape that the teacher held up, they held up the shape. The shapes were traded and verbal direction was given instead of an example.

Lesson #13

Reviewed Lesson #12.

Lesson #14

Reviewed Lesson #13. A shape was also drawn on the board and whoever could name it was allowed to trace it.

Lesson #15

They were asked to trace a certain shape on the chalkboard and then they erased the figure that had been named.

Lesson #16

The children traced specific shapes on the board. They also had to match the cardboard shapes to the ones drawn on the chalkboard.

Lesson #17

Table work with the formboard, puzzles, and cutouts was done at the desks. They found the shapes according to size and color.

Lesson #18

They traced the shapes on the board. Also, small shapes were held in the teacher's hand and the subject picked a hand and had to identify the shape that he had picked.

Lesson #19

Reviewed Lesson #18.

Lesson #20

The children worked at tables using formboards and puzzles. The children were also taught that circles roll and other shapes slide. The children took turns identifying the shapes.

Lesson #21

The children were given paper with three of the shapes drawn and they were instructed to color all the triangles, all the squares, and all the circles, to direction.

Lesson #22

The children were asked to identify the shapes as the shapes were put on the board.

Lesson #23

The children identified the shapes on the board and the cardboard shapes that they held in their hands. Small objects were placed in the subjects' hand and they had to identify the shape.

Lesson #24

Reviewed Lesson #23. Children were asked to trace two shapes in the proper order.

Lesson #25

Identified the shapes held in the hand. Trace and erase the shapes on the chalkboard and trace two shapes in a row.

Lesson #26

Reviewed Lesson #25.

Lesson #27

Identified, matched, and traced the cardboard shapes to the shapes on the blackboard.

Lesson #28

The teacher held objects in both hands. The students picked a hand, identified the object, and then traced that same object on the chalkboard.

Lesson #29

Reviewed Lesson #28.

Lesson #30

Reviewed Lesson #29.

Lesson #31

The children felt the shapes with their eyes closed. Their hands were held behind their backs and the shapes were placed in their hands and they identified the shape.

## TREATMENT #2

Lesson Plan

The subjects were familiarized with the verbal cues to walk forward, to walk backward, to walk sideways, to hop, and to jump. The children were encouraged to move around the figures throughout the lessons. The subjects were taught to play games while walking around the figures.

They were also given the opportunity to identify the figures and they were encouraged to make the figures from the materials that were available.

Each child progressed at his own level. Some children learned the shapes faster than other children and, therefore, they were introduced to new figures.

Some of the children spent many lessons reviewing the fundamental movements around the figures while other children were able to begin to work with the small objects. These small objects were introduced around the 18th lesson and were in the shapes of circles, squares, and triangles. The children were encouraged to identify these objects. This part of the lesson usually entailed the last five minutes of the lesson.

The lessons were planned on a day-to-day basis with the needs of the child in mind. It often meant that one lesson would be repeated many days before the child could move on to a new concept. Sometimes a child would show progress for a time and then would regress. Because of this, it was necessary to find the starting point for the child for each lesson and then continue from there.

# APPENDIX B

# RATING SCALE

## Two Trials for Each Figure

A. Circle

1. 5 points

   a. Size
      (1) on an 8 x 11 sheet of paper the drawing should cover 1/2 - 3/4 of the paper
      (2) no difficulty in beginning the drawing

   b. Direction
      (1) right-handed person - counterclockwise
      (2) left-handed person - clockwise

   c. Shape
      (1) no overlapping at beginning and ending of circle
      (2) round with no flat edges
      (3) circle is completely closed

2. 3 points

   a. Size
      (1) drawing too large
      (2) drawing too small

   b. Direction
      (1) does not go in preferred direction - as described above
      (2) slight wandering

   c. Shape
      (1) has minor errors (some degree of flatness)
      (2) slight overlapping
      (3) circle is not completely closed

3. 1 point

   a. Size
      (1) too large
      (2) too small

   b. Direction
      (1) uses whole body to produce the figure
      (2) marked wandering

c. Shape
   (1) marked overlapping
   (2) distorted - no definite shape
   (3) circle is not closed
   (4) flat

4. 0 point

   (1) unable to produce desired results

B. Square

1. 5 points

   a. Size
      (1) on an 8 x 11 sheet of paper the drawing should cover 1/2 - 3/4 of the paper
      (2) no difficulty in beginning the drawing

   b. Direction
      (1) right-handed person - left to right direction
      (2) left-handed person - right to left direction
      (3) use of the hand and not the whole body

   c. Shape
      (1) corners squared
      (2) horizontal lines are parallel
      (3) vertical lines are perpendicular

2. 3 points

   a. Size
      (1) drawing too large
      (2) drawing too small
      (3) two or three trials before actual completion of drawing

   b. Direction
      (1) does not go in preferred direction as described above
      (2) slight wandering or difficulty in drawing

   c. Shape
      (1) has minor errors
      (2) corners may be slightly "dog-eared"
      (3) 2 lines may be curved or slanted
      (4) slight overlapping - some segmenting

3. 1 point

   a. Size
      (1) drawing too large
      (2) drawing too small

   b. Direction
      (1) uses whole body to produce the shape
      (2) marked wandering

   c. Shape
      (1) four corners are "dog-eared"
      (2) all lines are not either perpendicular or parallel
      (3) overlapping
      (4) segmented

4. 0 point

      (1) unable to produce desired shape

C. Triangle

1. 5 points

   a. Size
      (1) on an 8 x 11 sheet of paper the drawing should cover 1/2 - 3/4 of the paper
      (2) no difficulty in beginning the drawing

   b. Direction
      (1) right-handed person - left to right direction
      (2) left-handed person - right to left direction
      (3) use of the hand and not the whole body

   c. Shape
      (1) no segmentation
      (2) lines diagonal
      (3) corners are pointed

2. 3 points

   a. Size
      (1) drawing too large
      (2) drawing too small
      (3) two or three trials before actual completion of drawing

   b. Direction
      (1) does not go in preferred direction as described above
      (2) marked wandering or difficulty in drawing

c. Shape
   (1) minor errors - some wandering
   (2) some "dog-ears"
   (3) minor segmentation

3. 1 point

   a. Size
      (1) drawing too large or small

   b. Direction
      (1) uses whole body to produce the shape
      (2) marked wandering

   c. Shape
      (1) gross segmentation
      (2) stair stepping
      (3) marked wandering
      (4) marked "dog-ears"

4. 0 point

      (1) unable to produce desired results

RATING SCORE SHEET

| SUBJECTS | CIRCLE Trial #1 | CIRCLE Trial #2 | SQUARE Trial #1 | SQUARE Trial #2 | TRIANGLE Trial #1 | TRIANGLE Trial #2 |
|---|---|---|---|---|---|---|
| #1 | | | | | | |
| #2 | | | | | | |
| #3 | | | | | | |
| #4 | | | | | | |
| #5 | | | | | | |
| #6 | | | | | | |
| #7 | | | | | | |
| #8 | | | | | | |
| #9 | | | | | | |
| #10 | | | | | | |
| #11 | | | | | | |
| #12 | | | | | | |
| #13 | | | | | | |
| #14 | | | | | | |
| #15 | | | | | | |
| #16 | | | | | | |
| #17 | | | | | | |

# APPENDIX C

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #1 C. A. 8 yrs. 9 mos.

Birthdate: 1959-1-8 M.A. 9 yrs. 11 mos.

School: Moore I.Q. 39

Examiner: Vera Lentz Date tested 1967-11-16

Referral Source: E. M. Widemon, teacher

Reason for Referral: Re-Evaluation

Test Behavior:

Subject #1 was cooperative and seemed to enjoy the testing situation. He has a speech problem which made it difficult at times to understand what he said. On this test he was given credit only for that which he said that was understandable. It was not difficult to establish a positive relationship with subject.

Test Results & Interpretation:

On the basis of this test, subject is functioning as one who is mentally defective. He was unable to answer all questions at the 2 year level; he could answer none at the 4½ year level. Subject's best performance was his ability to name objects from memory that were shown and then hidden from him. At the 4 year level he was able to identify pictures shown to him. He was able to solve a simple pictorial puzzle at the 3½ year level.

Recommendation:

The examiner feels subject should remain in the trainable group in Special Education.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #2 C.A. 7 yrs. 1 mos.

Birthdate: 57-10-9 M.A. 3 yrs. 11 mos.

School: Moore I.Q. 52

Examiner: Ausband Date tested 64-10-27

Referral Source: Juanita King, teacher

Reason for Referral: suspected EMR

Test Behavior:

When Subject #2 entered the testing situation, he was extremely shy and refused to raise his head. After talking about his family and counting his milk money, he agreed to play the games. He quickly became interested in the simple tasks presented to him. For the majority of the test, he was quiet, but at ease.

Test Results & Interpretation:

This score is at the lower range of educable mental retardation. The basal age was established at year III. All items were failed at year VI. Visual discrimination was extremely poor. There also seemed to be an inability to comprehend simple directions. Practical ability was relatively strong. Vocabulary tested by naming pictured objects was at the level of year III. At year V, subject was able to fold a double triangle and give the definition of a "bat" and of a "ball."

Recommendation:

Placement with the youngest trainable group. After a year in this group, subject should be re-evaluated for possible placement in an EMR class.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #2 C.A. 10 yrs. 1 mos.

Birthdate: 1957-10-9 M.A. 6 yrs. 5 mos.

School: Moore I.Q. 54

Examiner: Vera Lentz Date tested 1967-11-16

Referral Source: Elizabeth M. Widemon

Reason for Referral: Re-evaluation

Test Behavior:

Subject #2 was quiet and serious in manner. He seemed comfortable in adult company. The examiner feels this is a reasonable estimate of his ability at this time.

Test Results & Interpretation:

On the basis of this test, subject is functioning as one who is mentally defective. He was able to answer all questions at the 4 year level; he could answer none at the 8 year level. His vocabulary tested about like that of a 6 year old. Subject's best performance was his ability to detect differences between words at the 6 year level. He could not detect similarities and differences between pictures at the 5 year level. His eye hand coordination seemed about like that of a 5 year old. He was able to complete a simple task after having seen the examiner do it. He could not solve a 2 part puzzle whose solution had not been shown to him.

Recommendation:

Subject is properly placed in the retarded group.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #3 C.A. 8 yrs. 7 mos.

Birthdate: 1959-4-13 M.A. 3 yrs. 6 mos.

School: Moore I.Q. 39

Examiner: Vera Lentz Date tested 1967-11-16

Referral Source: Mrs. Boswell, teacher

Reason for Referral: Re-evaluation

Test Behavior:

Subject #3 seemed happy and curious about the articles in the examiner's kit. She responded to commands, but her ability to talk was limited. Subject was given credit only for verbal items that were intelligible to the examiner; it is possible that she may have given some answers for which she did not receive credit. It was not difficult to establish a positive relationship with subject.

Test Results & Interpretation:

On the basis of this test, subject is functioning as one who is mentally defective. She was able to answer all questions at the 3 year level; she could answer none at the 6 year level. Subject's best performance was her ability to define words at the 5 year level. She was able to detect similarities and differences among pictures at the 4½ year level. She was able to name objects from memory at the 4 year level.

Recommendation:

Subject is properly placed in a trainable retarded group.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #4 C.A. 7 yrs. 3 mos.

Birthdate: 58-11-18 M.A. 3 yrs. 8 mos.

School: Moore I.Q. 47

Examiner: Ausband Date tested 66-2-15

Referral Source: Teacher

Reason for Referral: Verify placement

Test Behavior:

Subject #4 was completely at ease. At times he grabbed for the test materials. When he became a little tired toward the end of the session, he was a little difficult to control and was slightly hyperactive.

Test Results & Interpretation:

This score is within the range of trainable mental retardation. Subject based at three year level. He passed 4 out of 6 items of the level of three years six months.

At year four, he passed Pictorial Identification and Discrimination of Form.

At the level of four years, six months, subject could remember a set of three directions and carry them out.

He passed Definitions at the Five Year level.

Recommendation:

Placement in the TMR program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #4 C.A. 5 yrs. 10 mos.

Birthdate: 1958-11-18 M.A. 3 yrs. 4 mos.

School: Grade I.Q. 52

Grade Equivalent
Classification Borderline
Trainable-educable

Date tested: 1964-9-30

Referral:

Subject #4 was referred to this office by his mother on the recommendation of Dr. Elizabeth Ford, subject's pediatrician. Dr. Ford felt that subject was mentally retarded and would profit from placement in the kindergarten operated by the Greensboro Association for Retarded Children.

Test Behavior:

Subject #4 was accompanied to my office by both parents and a younger sister who seemed quite alert. The family gives the appearance of being a close one with the interest of both children utmost in their minds. Subject entered readily into the testing situation and was not disturbed when his mother was asked to wait outside the room. He seemed to enjoy the testing situation and was an enjoyable child to work with. Subject's basal age was 2 years, 6 months; at the 3 year level he was unable to build the Block Bridge or pass the Picture Memories. The other 4 items were passed successfully. At the 3 year, 6 month level all items except the Response to Pictures item were passed. At the 4 year level only the picture identification item was passed. All were failed at the 4 year, 6 month level. The above stated performance yields a mental age of 3 years, 4 months and an intelligence quotient of 52. This I.Q. places subject in the borderline class between educable and trainable.

Recommendation:

Placement in the BARC Kindergarten until such time as it is felt that he is ready to enter a more formal school situation. At such time a re-evaluation is recommended to determine whether or not he should enter classes for trainable or educable children.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #5 C.A. 6 yrs. 2 mos.

Birthdate: 9-16-60 M.A. 2 yrs. 9 mos.

School: Bluford I.Q. 39

Examiner: Masyck Date tested 11-2-64

Referral Source: Teacher

Reason for Referral: Possible special class placement

Test Behavior:

Subject #5 was active, distractable, and gave poor attention. He was also affectionate and pleasant. He moved about the room as he pleased and talked about whatever came to mind; this also included questions. Much encouragement was needed and he responded well to this. His speech is infantile, but he talks easily.

Test Results & Interpretation:

Today's intellectual evaluation indicates a mental age of 2-9, which, relative to subject's chronological age yields an intelligence quotient of 39. This indicates trainable ability. All creditable responses were critically below expectancy. It is felt that this is a reliable estimate of present ability.

Recommendation:

Consider for placement in kindergarten program for retardates.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #6 C.A. 6 yrs. 4 mos.

Birthdate: 1957-5-11 M.A. see below

School: Bluford I.Q. see below

Examiner: Heptinstall Date tested 1963-9-9

Referral Source: school

Reason for referral: programming

Test Behavior:

Subject #6 is under medication to control seizures (phenobarbital is used according to instructions from physician at Medical School, Chapel Hill, N. C.). He does not say words; however, he does communicate by sound and motion to a limited degree. Subject #6 moves very slowly and shows poor muscular coordination. He seems to be somewhat unaware of surroundings.

Test Results & Interpretation:

He performed these items satisfactorily:

Year III - stringing beads - 4 were required to pass. Subject strung 13 in the two minutes allowed; bridge building with blocks; copy a circle; drawing a vertical line.

Year III 6 - comparison of balls; patience: pictures; sorting buttons: no errors.

Year IV - naming of objects from memory (his language was guessed somewhat); discrimination of forms: 9 out of 10. On this basis an IQ in the forties is assumed.

Recommendation:

Kindergarten for mental retardates or remaining at home. He would probably require a great deal of attention to prevent his being hurt by the other children. If indicated, re-test using a WISC.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #7 C.A. 8 yrs. 0 mos.
Not Testable

Birthdate: 9-26-54 M.A.

School: Jones I.Q.

Examiner: Jack Carter Date tested 9-13-52

Referral:

Previous I.Q. Tests: Name, date and results.

Stanford Achievement Test, Form ___ Date ___ Bat. Med. ___ Norm. ___

Reason for Referral: Candidate for special education

Test Behavior:

On the Binet Subject #7 successfully completed Form Board at the 2 year level, but did not respond to any of the other items. He did not seem to understand the instructions and would simply manipulate the objects or blandly point at different parts of the test stimulus.

On the Peabody Picture Vocabulary Test he seemed to understand that he was to point to an object but did not respond correctly to any of the stimulus words.

Subject does not talk to anyone at school. The teacher reports, "He is no problem, he just sits and stares." It is reported that he does not talk at all, including to parents at home.

When walking, subject walks with arms out from a bent elbow position.

He does respond to such instructions as "sit down," "stand up," etc.

Recommendation:

Placement in a class for the severely mentally retarded for teacher evaluation and recommendation, continued placement pending these recommendations. The parents should seek institutional placement as soon as possible.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #7 C.A. 13 yrs. 9 mos.

Birthdate: 1954-9-26 M.A. 2 yrs. 4 mos.

School: Moore I.Q. 30

Examiner: Vera Lentz Date tested 1967-10-4

Referral Source: Frank Saunders, Director Special Ed.

Reason for Referral: Mental evaluation

Test Behavior:

Subject #7 was quiet in manner and seemingly confident in adult company. His attention span was very short. He repeatedly leaned his head backwards and looked around the room. Several times he laughed aloud when he felt he had performed a task correctly. He appeared completely fascinated by a penny used in the testing interview. The examiner feels this score is a reasonable estimate of subject's ability at this time.

Test Results & Interpretation:

On the basis of this score the examiner feels subject needs help of a type which is not available in a trainable group. Some consideration should be given to placing subject in an institution. Subject was able to answer all questions except one at the 2 year level. The question missed was using word combinations. Subject used only one word in responding to questions. He verbally identified 12 pictures at the 2½ year level. Though he exhibited some difficulty in muscular coordination he built a tower 12 blocks high. In response to a request he built a bridge of blocks. He obeyed simple commands at the 2½ year level. He could not repeat 2 numbers at this level. He could not copy a circle at the 3 year level. He did use the pencil and draw a half circle. He was able to detect which of two circles was larger at the 3½ year level. He did best on items which required no verbal response.

Recommendation:

The examiner feels subject should be considered for placement in an institution where he can receive specialized help.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #8 C.A. 6 yrs. 9 mos.

Birthdate: Sept. 8, 1955 M.A. 1 yrs. 6 mos.

School: Washington (not in school) I.Q. 20-30

Examiner: Jack Carter Date tested May 31, 1962

Referral:

Previous I.Q. Tests: Name, date and results.

Stanford Achievement Test, Form ___ Date ___ Bat. Med. ___ Norm. ___

Reason for Referral:

Test Behavior:

Subject #8 responded very well to the testing situation. A positive relationship was easy to establish, motivation was fair but communication and understanding prevented the examiner from scoring more than 18 months credit on the Binet. Her social behavior, emotional response, and relationship with her peers would indicate this to be a minimum estimate of her ability.

Test Results & Interpretation:

Even though subject's ability is below that usually recommended for trainable program, the examiner would feel that because of the above mentioned asset, that she would respond to a program for the trainable mentally retarded child and that a more accurate estimate of her ability can be obtained at a later date.

Recommendation:

Placement in a class for the severely mentally retarded.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #9 C.A. 6 yrs. 10 mos.

Birthdate: 58-10-17 M.A. 2 yrs. 4 mos.

School: Charles E. Moore I.Q. *About 30

Examiner: Heptinstall Date tested 65-8-30

Referral Source: Grandmother *Usual formula yields 34

Reason for Referral: Evaluation

Test Behavior:

The subject was easily distracted and it was difficult to obtain his attention. He tried to grab test materials but did not persist when asked to sit down. He was a smiling, pleasant little fellow.

Test Results & Interpretation:

These test results indicate that the subject is in the trainable range of intelligence. Speech is often unintelligible. He passed all test items at the Year II level. At Year II-6, he was able to identify objects by their use and to obey simple commands. At Year III, he strung five beads (four are required for passing) and to draw a vertical line. There was no success after that level. This evaluation indicates the need for a special program.

Recommendation:

Placement in a class for trainable mentally retardates.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #10 C.A. 7 yrs. 6 mos.

Birthdate: 56-10-25 M.A. 3 yrs. 7 mos.

School: Trainable Kindergarten (Starmount) I.Q. 44

Examiner: M. A. Heptinstall Date tested 64-4-17

Referral Source: Director, Mr. Frank Saunders

Reason for Referral: suspected retardation

Test Behavior:

The subject was quiet, smiling, and cooperative although his attention span on test matters was brief.

Test Results & Interpretation:

These test results indicate a child in the trainable mentally retarded range. He will need a special program geared to his limited abilities.

The subject was successful with the Form Board, Identifying Parts of the Body, Block Building, Tower and Picture Vocabulary at the Year II level. He passed everything at the Year II-6 level. He showed good relative ability on practical concrete or pictured matters. He was weak in following oral directions.

Recommendation:

Assignment to a class for trainable mental retardates.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #10 C.A. 11 yrs. 1 mos.

Birthdate: 1956-10-25 M.A. 4 yrs. 1 mos.

School: Moore I.Q. 41

Examiner: Vera Lentz Date tested 1967-11-28

Referral Source: Mrs. Elizabeth Widemon, Teacher

Reason for Referral: Re-evaluation

Test Behavior:

Subject #10 exhibited normal activity level and seemed comfortable in adult company. He was quick to respond to all items. It was not difficult to establish a positive relationship with subject.

Test Results & Interpretation:

On the basis of this test, Subject #10 is functioning as one who is defective in mental ability. He was able to answer all questions at the 3½ year level; he could answer none at the 6 year level. Subject's vocabulary seemed about like that of a 5 year old. His best performance was his ability, at the 5 year level, to complete a man, to define words, and to copy a square. He could not identify pictures or discriminate forms at the 4 year level.

Recommendation:

The examiner feels subject is properly placed in a trainable group.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #10 C.A. 11 yrs. 7 mos.

Birthdate: 1956-10-25 M.A. 4 yrs. 9 mos.

School: Moore I.Q. 46

Examiner: Vera Lentz Date Tested 1968-5-17

Referral Source: Research for Joan Pharnes

Reason for Referral: Research

Test Behavior:

Subject #10 seemed relaxed during the testing interview. He was cooperative and apparently did his best. It was not difficult to establish a positive relationship with subject.

Test Results & Interpretation:

On the basis of this test, Subject #10 is functioning as one who is mentally retarded. He was able to answer all questions at the 4 year level; he could answer none at the 7 year level. His vocabulary seemed about like that of a 4 year old. Subject's best performance was his ability, at the 6 year level, to perform a simple task involving the concept of the word "shortest." At the 5 year level, he was able to answer all items except one in which he was to detect similarities and differences among things. He was able to answer a similar question at the 4½ year level. He could not, at the 4½ year level, supply opposite analogies, perform 3 simple tasks in order, or answer an informational question concerning materials.

Recommendation:

Remain in the trainable program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #11 C.A. 8 yrs. 2 mos.

Birthdate: 1960-3-16 M.A. 3 yrs. 7 mos.

School: Moore I.Q. 41 (estimated)

Examiner: Vera Lentz Date tested 1968-5-17

Referral Source: Joan Pharnes

Reason for Referral: Research

Test Behavior:

Subject #11 was almost non-verbal and had difficulty communicating what he seemed to know. For this reason the I.Q. had to be estimated.

Test Results & Interpretation:

Since Subject #11 had a verbal problem the examiner started him at year 2. The only question missed at this level was one which required word combinations. He answered all questions (some verbally) at year 2½. At year 3 he was able to string beads, to build a bridge of blocks, and to copy a circle. At this level he could not answer questions requiring verbal fluency, memory, or muscular response to a simple command. At year 3½ he could not respond to pictures verbally or answer a question requiring comprehension. He was able to answer questions requiring visual discrimination at the 4 and 4½ year levels. At the 5 year level he was able to repeat from memory a single task shown him, to define words, and to copy a square. He could not, at the 5 year level, complete an unfinished man, detect similarities and differences among things, or solve a two-card puzzle.

Recommendation:

Remain in trainable program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #12 C.A. 7 yrs. 1 mos.

Birthdate: 58-11-13 M.A. 2 yrs. 10 mos.

School: Jonesboro I.Q. 33

Examiner: Ausband Date tested 66-1-7

Referral Source: teacher

Reason for Referral: suspected retardation

Test Behavior:

Subject #12 was quiet, but happy in the testing situation. His use and comprehension of language was very limited.

Test Results & Interpretation:

This score is within the range of trainable mental retardation. Subject operated with complete success at the two year level. Only one item was failed at the level of two years six months and at the three year level. All items were failed at the level of three years six months.

Recommendation:

Exclusion from school until there is space in the trainable program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #12 C.A. 9 yrs. 6 mos.

Birthdate: 1958-11-13 M.A. 5 yrs. 1 mos.

School: Moore I.Q. 53

Examiner: Vera Lentz Date tested 1968-5-17

Referral Source: Joan Pharnes

Reason for Referral: Research

Test Behavior:

Subject #12 was shy but willing to attempt each item used in the testing interview. The examiner noted that he, several times, rubbed his eyes. This may suggest visual difficulty or frustration because of the difficulty of some items.

Test Results & Interpretation:

On the basis of this test, Subject #12 is functioning as one who is mentally defective. He was able to answer all questions at the 4 year level; he could answer none at the 6 year level. His vocabulary seemed about like that of a 4 year old. Subject's best performance was his ability at the 5 year level to complete a partly drawn man, to define words, to copy a square, and to put a two-piece puzzle together at the 4½ year level. He could not perform in order 3 simple tasks, answer an informational question, or make aesthetic comparisons.

Recommendation:

Remain in trainable program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #13 C.A. 7 yrs. 4 mos.

Birthdate: 57-8-7 M.A. 3 yrs. 3 mos.

School: Jones I.Q. 40

Examiner: Ausband Date tested 64-13-14

Referral Source: teacher

Reason for Referral: suspected TMR

Test Behavior:

Subject #13 sat in her seat and, although her attention span was brief, gave reasonable effort to the tasks. She repeated frequently that her mother was giving her five baby-dolls for Christmas. She would also say she was getting any of the test materials (i.e. blocks or beads) for Christmas. Near the end of the test, she expressed a desire to go home but was encouraged to continue. A visual difficulty, slight orthopedic problem and a speech handicap were noted.

Test Results & Interpretation:

This score is within the range of trainable retardation. The basal age was established at Year II-6. At Year III, the only item failed was drawing a vertical line. At the Level III-6, Comparison of balls (which is bigger?) and Comprehension (What must you do when you are thirsty? etc) were failed. Vocabulary as measured by naming pictured objects was at the level of II-6. All items were failed at Year IV.

Recommendation:

Placement in the trainable program at Moore. The principal at Jones, Mrs. Woods, should contact Mr. Saunders to explore transportation possibilities.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #13 C.A. 10 yrs. 10 mos.

Birthdate: 1957-7-23 M.A. 4 yrs. 10 mos.

School: Moore I.Q. 47

Examiner: Vera Lentz Date tested 1968-5-17

Referral Source: Joan Pharnes

Reason for Referral: Research

Test Behavior:

Subject #13 was quiet, cooperative, and seemingly happy during the testing interview. It was not difficult to establish a positive relationship with her.

Test Results & Interpretation:

On the basis of this test, Subject #13 is functioning as one who is mentally defective. She was able to answer all questions at the 4 year level; she could answer none at the 6 year level. Her vocabulary seemed severly limited. Subject's best performance was her ability at the 5 year level to complete an unfinished man, to perform a task demonstrated to her, to define words, to copy a square, and to detect similarities and differences between things. She could not at this level solve a two-piece puzzle. She could not at the 4½ year level make aesthetic comparisons.

Recommendation:

Remain in trainable program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #14 C.A. 6 yrs. 9 mos.

Birthdate: 59-1-12 M.A. 3 yrs. 3 mos.

School: Hampton I.Q. 44

Examiner: Heptinstall Date tested 65-10-6

Referral Source: Teacher, Mrs. Johnson

Reason for Referral: suspected retardation

Test Behavior:

The subject was reluctant to come for testing so the teacher accompanied her but left in several minutes and the subject stayed willingly. At times it was difficult to draw out an answer and it was sometimes impossible to elicit any reply. She became tired toward the end of the session.

Test Results & Interpretation:

These test results indicate that the subject is in the trainable mentally retarded range of intelligence. The basal age was established at Year II-6, and the following additional credits were earned: Year III-5 months; Year III - 6-2 months; Year IV - 1 month and Year IV - 6-1 month. She showed some degree of visual discrimination but at a low level (Sorting Buttons - Year III - 6). Her highest level of success was with Comprehension (Year IV - 6) when she was asked, "What do we do with our eyes?." This evaluation indicates the need for a special program.

Recommendation:

Assignment to a class for trainable mental retardates.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #14 C.A. 9 yrs. 4 mos.

Birthdate: 1959-1-12 M.A. 4 yrs. 2 mos.

School: Moore I.Q. 44

Examiner: Vera Lentz Date tested 1968-5-16

Referral Source: Joan Pharnes

Reason for Referral: Research

Test Behavior:

Subject #14 was happy in manner and seemingly did her best. She laughed aloud several times. It was not difficult to establish a positive relationship with subject.

Test Results & Interpretation:

On the basis of this test, Subject #14 is functioning as one who is mentally defective. She was able to answer all questions at the 3½ year level; she could answer none at the 6 year level. Her vocabulary seemed about like that of a 5 year old. Subject's best performance was her ability at the 5 year level to define words; this was the only question she could answer at this level. At the 4½ year level she was able to make aesthetic comparisons, perform 3 tasks in order, and answer a question requiring comprehension. She could not, at this level or at a lower level, supply analogies. At the 4½ year level she could not detect similarities and differences among things. She could not, at the 4 year level, discriminate among forms or answer a question requiring comprehension.

Recommendation:

Remain in trainable program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #15 C.A. 7 yrs. 6 mos.

Birthdate: 59-2-14 M.A. ?

School: Moore, TMR I.Q. Estimated 30-35

Examiner: Heptinstall Date tested 66-8-25

Referral Source: Mother

Reason for Referral: Evaluation

Test Behavior:

Subject #15 is a fairly large placid boy. He soldom spoke although he did at times respond to direct questions. He smiled and seemed interested mildly.

Test Results & Interpretation:

Testing was started at Year II and at this level Subject #15 passed: Three-hole Form Board, Block Building: Tower, Picture Vocabulary (6 pictures)

At Year II-6 he was able to succeed with Naming Objects, Repeating Two Digits.

At Year III, subject lacked motor control to reproduce a circle but at that level he did respond to demonstration and draw a vertical line. There were no successes beyond this. Subject's gross motor control is nearly normal, and he sits and walks with good control. There is some question about his vision which may have affected these results.

Recommendation:

Trial in a class for trainable mentally retarded children;although it was impossible to get a measurement, an estimate of 30-35 I.Q. is given. Whenever development makes a test of vision adequate, it should be undertaken. Hearing appears to be normal for speech.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #15 C.A. 9 yrs. 3 mos.

Birthdate: 1959-2-14 M.A. 3 yrs. 10 mos.

School: Moore I.Q. 40

Examiner: Vera Lentz Date tested 1968-5-16

Referral Source: Joan Pharnes

Reason for Referral: Research

Test Behavior:

Subject #15 seemed to enjoy the one-to-one relationship in the testing situation. He apparently did his best. It was not difficult to establish a positive relationship with Subject #15.

Test Results & Interpretation:

On the basis of this test, Subject #15 is functioning as one who is mentally defective. He was able to answer all questions at the 3 year level; he could answer none at the 6 year level. His vocabulary seemed severely limited. Subject's best performance was his ability, at the 5 year level, to perform a simple task after seeing the examiner demonstrate it and to define words. Subject could not answer questions requiring visual discrimination at the 3½ year level or at any higher level used in this test. He could not answer a question requiring memory and immediate recall at the 4 year level.

Recommendation:

Remain in trainable program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #16 C.A. 7 yrs. 2 mos.

Birthdate: 7-16-55 M.A. 3 yrs. 1 mos.

School: Jones I.Q. 39

Examiner: Jack Carter Date tested 9-13-62

Referral:

Previous I.Q. Tests: Name, date and results.

Stanford Achievement Test, Form ___ Date ___ Bat. Med. ___ Norm. ___

Reason for Referral: Candidate for Special Education

Test Behavior:

Subject #16 related well to the examination and to the examiner and motivation seemed good throughout the examination. Subject wears very thick glasses but still seems to have some difficulty in seeing. She holds her eyes very close to the paper while working.

Test Results & Interpretation:

Subject #16's basal level was at 2 and her highest level of success was at the 4 year, 6 month level at which she passed one test. She passed one test at the 4 year level and two tests at the 3 year, 6 month level.

Subject failed the Identifying Parts of the Body at the 2 yr. 6 mo. level. She seemed to have some difficulty discriminating the various parts of the body. For example, she would point at the arm for the hand, the knees for the feet, etc. She failed Block Building: Bridge at the 3 yr. level, as well as Copying a Circle. Both of these failures probably resulted from a visual motor difficulty. Subject was able to pass Pictorial Identification at the 4 yr. level and Pictorial Similarities and Differences at the 4 yr. 6 mo. level.

Recommendation:

Placement in a class for the severely mentally retarded. The examiner would recommend that the special teacher advise the parents of the need for a new visual examination and would ask that a report of this be sent to this office.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #16 C.A. 12 yrs. 4 mos.

Birthdate: 1955-7-16 M.A. 4 yrs. 10 mos.

School: Moore I.Q. 45

Examiner: Vera Lentz Date tested 1967-11-28

Referral Source: Elizabeth Widemon, Teacher

Reason for Referral: Re-evaluation

Test Behavior:

Subject #16 was cheerful and apparently at ease during the testing situation. It was not difficult to establish a positive relationship with her. The examiner feels this is a reasonable estimate of her ability at this time.

Test Results & Interpretation:

On the basis of this test, Subject #16 is functioning as one who is defective in mental ability. She was able to answer all questions at the 3½ year level; she could answer none at the 8 year level. Her vocabulary tested about like that of a 4 year old. Subject's best performance was her ability, at the 7 year level, to detect similarities between things. She was able to find differences between words at the 6 year level. She could not discriminate between forms at the 4 year level.

Recommendation:

Subject #16 seems to be properly placed in the trainable retarded program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #16 C.A. 12 yrs. 10 mos.

Birthdate: 1955-7-16 M.A. 5 yrs. 2 mos.

School: Moore I.Q. 46

Examiner: Vera Lentz Date tested 1968-5-16

Referral Source: Joan Pharnes

Reason for Referral: Research

Test Behavior:

Subject #16 was quiet, cooperative, and apparently at ease in the testing situation. It was not difficult to establish a positive relationship with her.

Test Results & Interpretation:

On the basis of this test, Subject #16 is functioning as one who is mentally defective. She was able to answer all questions at the 3½ year level; she could answer none at the 8 year level. Her vocabulary seemed about like that of a 7 year old. Subject's best performance was her ability, at the 7 year level, to detect similarities between things. At the 6 year level she was able to answer a question requiring a knowledge of differences between things. She could not, however, supply opposite analogies at any level used. She could not correctly make aesthetic comparisons at the 4½ year level. She was able to answer all questions, at the 5 year level, except one requiring repetition of a simple visual task. The last two items may not have been answered correctly because of her visual difficulty.

Recommendation:

Remain in trainable program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #17 C.A. 6 yrs. 3 mos.

Birthdate: 59-10-9 M.A. 2 yrs. 9 mos.

School: Jonesboro I.Q. 38

Examiner: Ausband Date tested 66-1-12

Referral Source: teacher

Reason for Referral: suspected retardation

Test Behavior:

Subject #17 was quiet and content to "play" the games. Her comprehension and use of language was severely limited.

Test Results & Interpretation:

This score is within the range of trainable mental retardation. Subject #17 operated with complete success at the two year level. One item out of 6 was failed at the level of two years six months. Two items out of 6 were failed at the three year level.

Recommendation:

Exclusion from school until space is available in the trainable program.

GREENSBORO PUBLIC SCHOOLS

Department of Special Education

Psychological Report

REVISED STANFORD-BINET, FORM L-M (1960)

Name: Subject #17 C.A. 8 yrs. 7 mos.

Birthdate: 1959-10-9 M.A. 4 yrs. 4 mos.

School: Moore I.Q. 48

Examiner: Vera Lentz Date tested 1968-5-16

Referral Source: Joan Pharnes

Reason for Referral: Research

Test Behavior:

Subject #17 was cooperative and attentive. She had a tendency to repeat the last part of each question asked her. It was not difficult to establish a positive relationship with her.

Test Results & Interpretation:

On the basis of this test, Subject #17 is functioning as one who is mentally defective. She was able to answer all questions at the $3\frac{1}{2}$ year level; she could answer none at the 6 year level. Her vocabulary was very limited. Subject's best performance was her ability, at the 5 year level, to complete a man, to perform a simple visual task, to define words, and to draw a square. She could not, at this level, detect similarities and differences among things or answer a question requiring spatial understandings. Her lack of discrimination was noted at the $4\frac{1}{2}$ year level; she could not make aesthetic comparisons or discriminate among things. She could not, at this level, perform 3 simple tasks in order. She could not supply opposite analogies at any level used in the test.

Recommendation:

Remain in trainable program.

# APPENDIX D

# APPENDIX D

In Test #4, Draw a Circle, Square, and Triangle, the scores on the drawings, as rated by the raters, were subjected to statistical analysis. An analysis of variance for repeated measures was used to see if there was a significant difference between the trials for each treatment. If a significant change occurred between the tests in the treatment groups, the Fisher's "t" test of significance for small correlated samples was computed between the trials in each treatment group.

TABLE VII

SUMMARY OF ANALYSIS OF VARIANCE FOR REPEATED MEASURES
CIRCLE - TREATMENT #1

| | Sum of Squares | df | Mean Square | F ratio |
|---|---|---|---|---|
| Between | 60.7 | 2 | 30.35 | 2.09 |
| Within | 622.5 | 8 | 77.81 | 5.37** |
| Interaction | 231.5 | 16 | 14.47 | |
| Total | 914.7 | 26 | | |

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.

TABLE VIII

SUMMARY OF ANALYSIS OF VARIANCE FOR REPEATED MEASURES
SQUARE - TREATMENT #1

| | Sum of Squares | df | Mean Square | F ratio |
|---|---|---|---|---|
| Between | 25.0 | 2 | 12.50 | .43 |
| Within | 698.1 | 8 | 87.26 | 3.00* |
| Interaction | 465.2 | 16 | 29.08 | |
| Total | 1188.3 | 26 | | |

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.

TABLE IX

SUMMARY OF ANALYSIS OF VARIANCE FOR REPEATED MEASURES
TRIANGLE - TREATMENT #1

| | Sum of Squares | df | Mean Square | F ratio |
|---|---|---|---|---|
| Between | 3.6 | 2 | 1.8 | .096 |
| Within | 999.0 | 8 | 124.88 | 6.69** |
| Interaction | 298.6 | 16 | 18.66 | |
| Total | 1301.2 | 26 | | |

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.

TABLE X

SUMMARY OF ANALYSIS OF VARIANCE FOR REPEATED MEASURES
CIRCLE - TREATMENT #2

| | Sum of Squares | df | Mean Square | F ratio |
|---|---|---|---|---|
| Between | 138.1 | 2 | 69.05 | 5.27* |
| Within | 599.5 | 7 | 85.64 | 6.54** |
| Interaction | 183.4 | 14 | 13.10 | |
| Total | 921.0 | 23 | | |

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.

TABLE XI

SUMMARY OF ANALYSIS OF VARIANCE FOR REPEATED MEASURES
SQUARE - TREATMENT #2

| | Sum of Squares | df | Mean Square | F ratio |
|---|---|---|---|---|
| Between | 416.0 | 2 | 208.00 | 12.26** |
| Within | 187.8 | 7 | 26.83 | 1.58 |
| Interaction | 237.5 | 14 | 16.96 | |
| Total | 841.3 | 23 | | |

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.

TABLE XII

SUMMARY OF ANALYSIS OF VARIANCE FOR REPEATED MEASURES
TRIANGLE - TREATMENT #2

| | Sum of Squares | df | Mean Square | F ratio |
|---|---|---|---|---|
| Between | 682.7 | 2 | 341.35 | 12.49** |
| Within | 451.2 | 7 | 64.46 | 2.36 |
| Interaction | 382.7 | 14 | 27.34 | |
| Total | 1516.6 | 23 | | |

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.

TABLE XIII

SIGNIFICANCE OF DIFFERENCE - TEST IV
CIRCLE - TREATMENT #2

| Test IV | "t" |
|---|---|
| Pre-test, Second test | 2.0 |
| Pre-test, Final test | 2.58* |
| Second test, Final test | 1.87 |

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.

TABLE XIV

SIGNIFICANCE OF DIFFERENCE - TEST IV
SQUARE - TREATMENT #2

| Test IV | "t" |
|---|---|
| Pre-test, Second test | 3.14** |
| Pre-test, Final test | 6.75** |
| Second test, Final test | 1.53 |

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.

TABLE XV

SIGNIFICANCE OF DIFFERENCE - TEST IV
TRIANGLE - TREATMENT #2

| Test IV | "t" |
|---|---|
| Pre-test, Second test | 2.23* |
| Pre-test, Final test | 6.22** |
| Second test, Final test | 2.52* |

*Significant at the .05 level of confidence.
**Significant at the .01 level of confidence.

TABLE XVI

TOTAL SCORE FOR EACH FOR THE CIRCLE, SQUARE, TRIANGLE

| SUBJECTS | CIRCLE | SQUARE | TRIANGLE |
|---|---|---|---|
| #1 | 25 | 11 | 6 |
| #2 | 50 | 54 | 57 |
| #3 | 51 | 41 | 22 |
| #4 | 46 | 38 | 4 |
| #5 | 20 | 10 | 20 |
| #6 | 53 | 18 | 18 |
| #7 | 24 | 22 | 22 |
| #8 | 21 | 8 | 7 |
| #9 | 55 | 26 | 53 |
| Total | 345 | 228 | 209 |
| #10 | 60 | 43 | 17 |
| #11 | 34 | 52 | 39 |
| #12 | 56 | 30 | 42 |
| #13 | 13 | 32 | 6 |
| #14 | 54 | 22 | 33 |
| #15 | 50 | 33 | 43 |
| #16 | 53 | 33 | 43 |
| #17 | 33 | 35 | 36 |
| Total | 353 | 280 | 259 |